Planning and Assistance Division

GENERAL BASIN MAP

ELKHORN RIVER BASIN

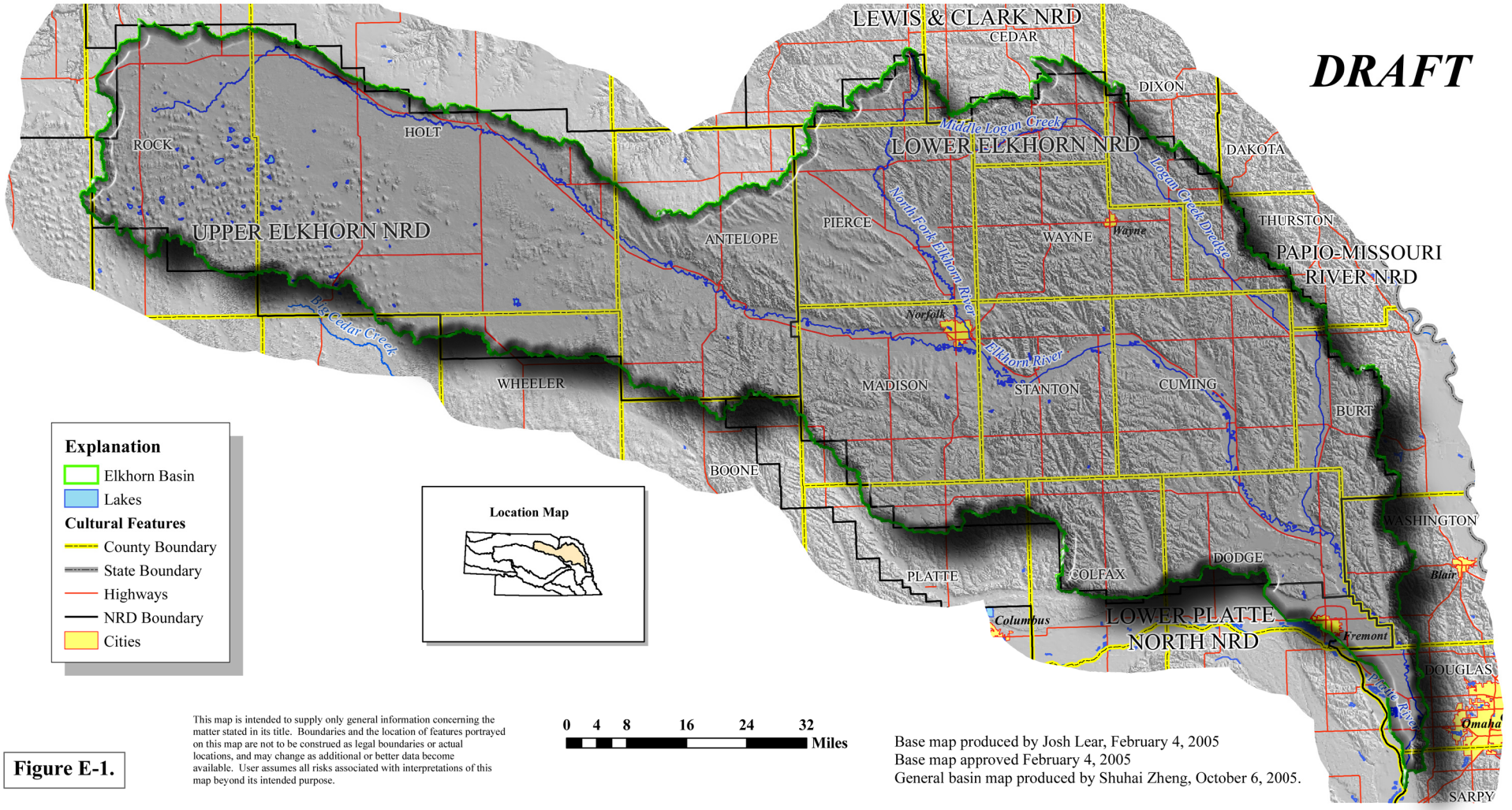

Figure E-1.

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Base map produced by Josh Lear, February 4, 2005
Base map approved February 4, 2005
General basin map produced by Shuhai Zheng, October 6, 2005.

General Surface Water Features

ELKHORN RIVER BASIN

Planning and Assistance Division

N
W E
S

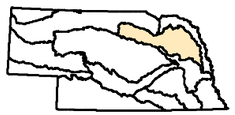
LEWIS & CLARK NRD
CEDAR
DIXON
DAKOTA
THURSTON
PAPIO-MISSOURI RIVER NRD
ROCK
HOLT
UPPER ELKHORN NRD
ANTELOPE
PIERCE
LOWER ELKHORN NRD
WAYNE
Wayne
Middle Logan Creek
Logan Creek Dredge
North Fork Elkhorn River
Norfolk
Elkhorn River
Big Cedar Creek
WHEELER
MADISON
STANTON
CUMING
BURT
BOONE
WASHINGTON
DODGE
Blair
PLATTE
COLFAX
Columbus
LOWER PLATTE NORTH NRD
Fremont
DOUGLAS
Omaha
SARPY

Explanation

Surface Water Features
- Rivers
- Intermittent Streams
- Canals/Ditches
- Lakes
- Elkhorn Basin

Cultural Features
- County Boundary
- State Boundary
- Highways
- NRD Boundary
- Cities

Location Map



0 4 8 16 24 32 **Miles**

This map is intended to supply only general information concerning the matter stated in its title. Boundaries and the location of features portrayed on this map are not to be construed as legal boundaries or actual locations, and may change as additional or better data become available. User assumes all risks associated with interpretations of this map beyond its intended purpose.

Base map produced by Josh Lear, February 4, 2005
Base map approved February 4, 2005
General surface water features map produced by Shuhai Zheng, October 6, 2005.

Figure E-2.

Department of Natural Resources

Planning and Assistance Division

Precipitation Gages

ELKHORN RIVER BASIN

N
W E
S

LEWIS & CLARK NRD
Hartington
CEDAR
DIXON
Middle Logan Creek
LOWER ELKHORN NRD
DAKOTA
Logan Creek Dredge
Newport
HOLT
O'Neill
ROCK
UPPER ELKHORN NRD
ANTELOPE
PIERCE
North Fork Elkhorn River
Wayne
WAYNE
THURSTON
PAPIO-MISSOURI RIVER NRD
Big Cedar Creek
Norfolk
Elkhorn River
WHEELER
MADISON
STANTON
CUMING
West Point
BURT
BOONE
WASHINGTON
Blair
DODGE
PLATTE
COLFAX
LOWER PLATTE NORTH NRD
Fremont
DOUGLAS
SARPY

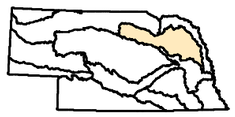
Explanation

- Elkhorn Basin
- Precipitation Gages

Cultural Features

- County Boundary
- State Boundary
- NRD Boundary

Location Map



This map is intended to supply only general information concerning the matter stated in its title. Boundaries and the location of features portrayed on this map are not to be construed as legal boundaries or actual locations, and may change as additional or better data become available. User assumes all risks associated with interpretations of this map beyond its intended purpose.

0 4 8 16 24 32 Miles

Base map produced by Josh Lear, February 4, 2005
Base map approved February 4, 2005
Precipitation gages map produced by Jeff Shafer, October 19, 2005.

Figure E-3.

Figure E-4. Annual Precipitation at Norfolk.

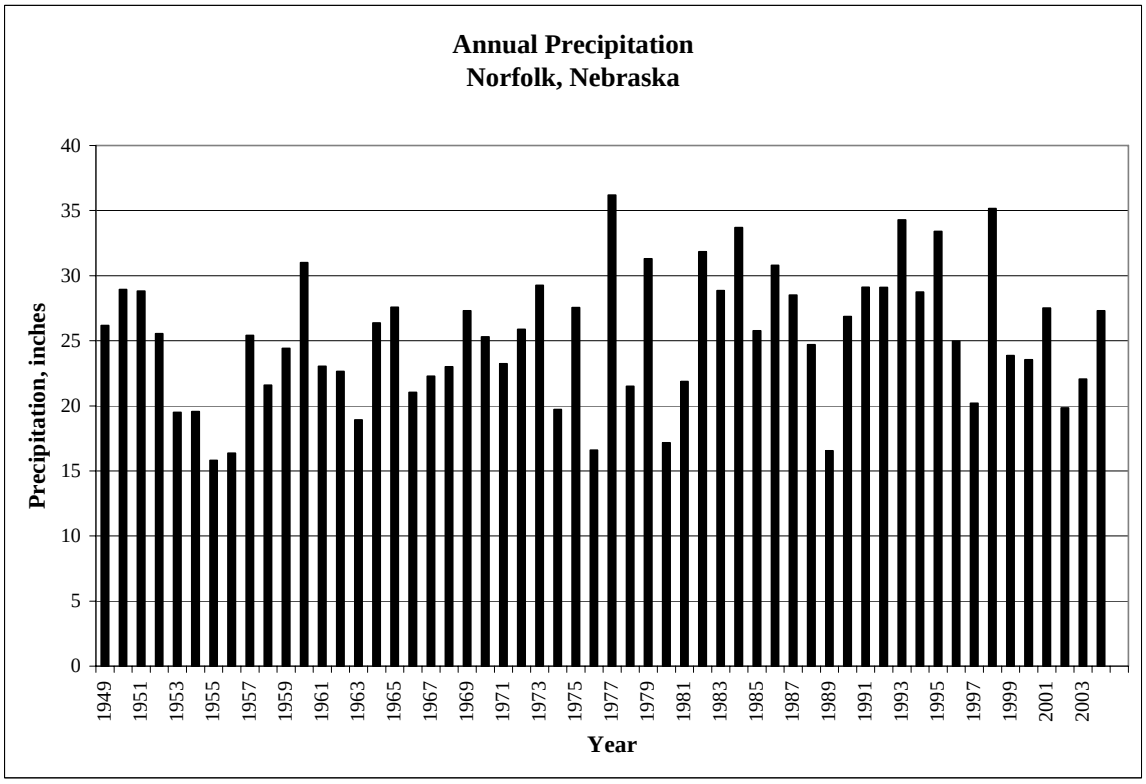


Figure E-5. Growing Season (May-September) Precipitation at Norfolk.

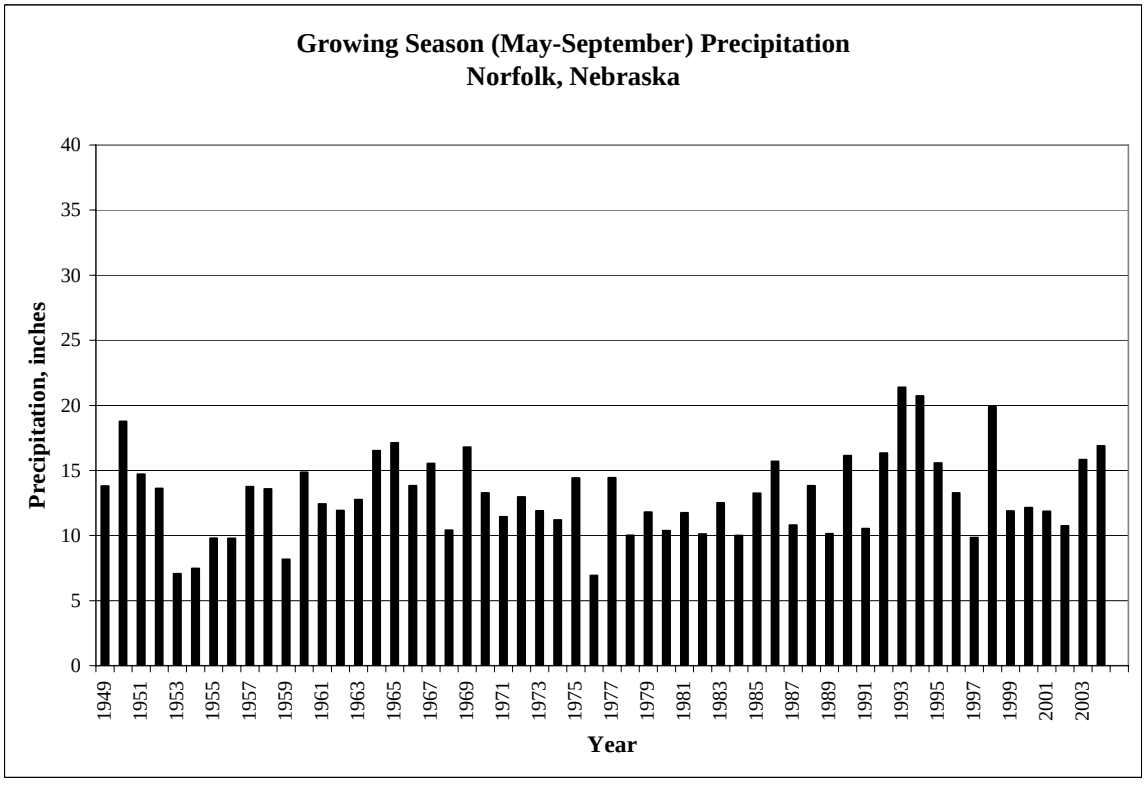


Figure E-6. Annual Precipitation at Newport.

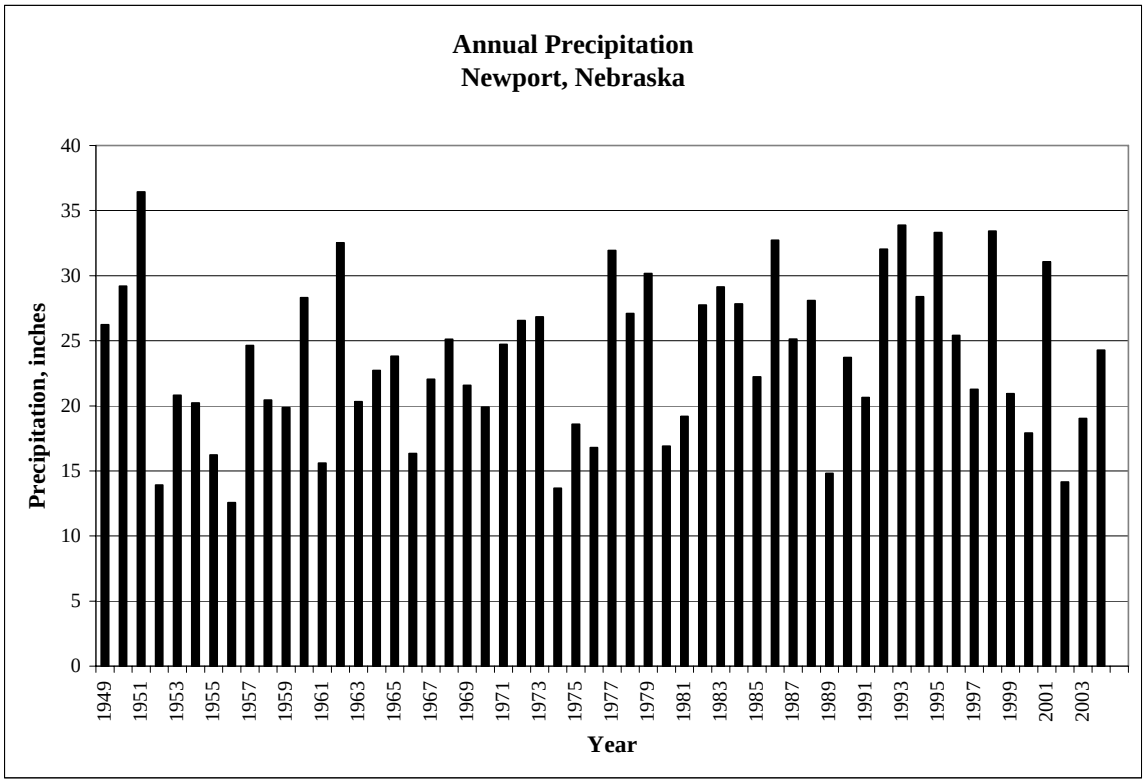


Figure E-7. Growing Season (May-September) Precipitation at Newport.

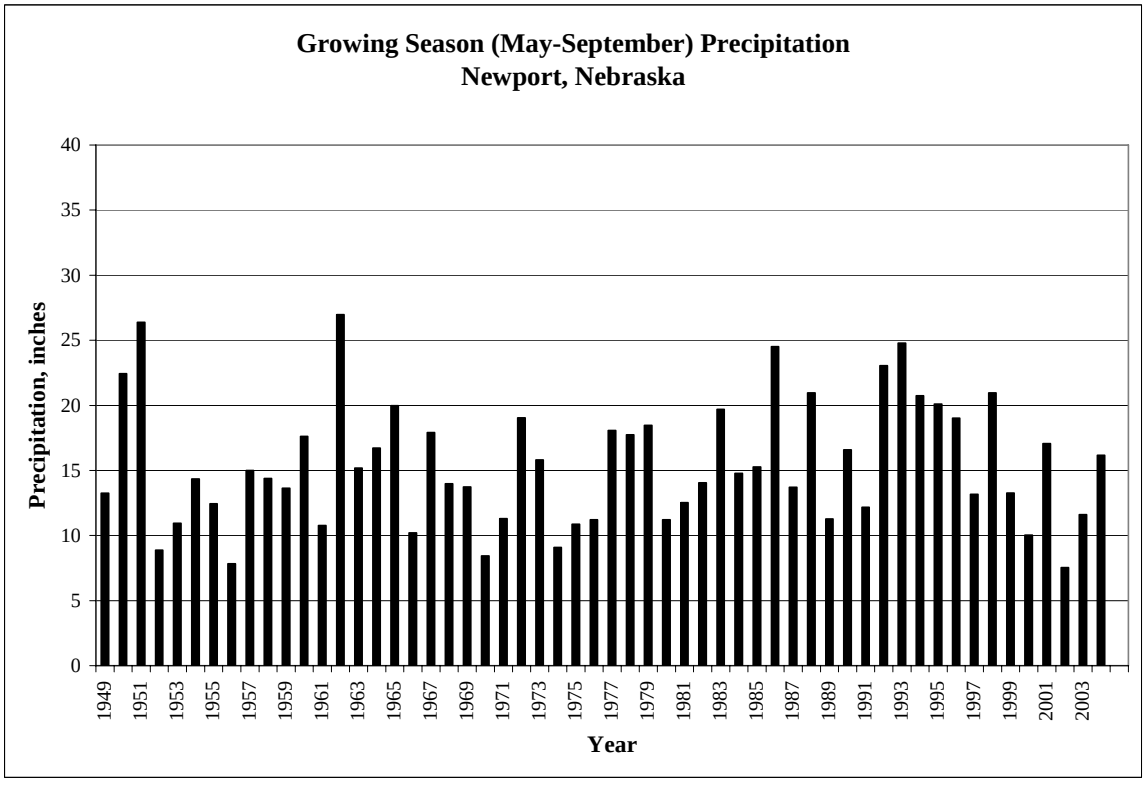


Figure E-8. Annual Precipitation at O'Neill.

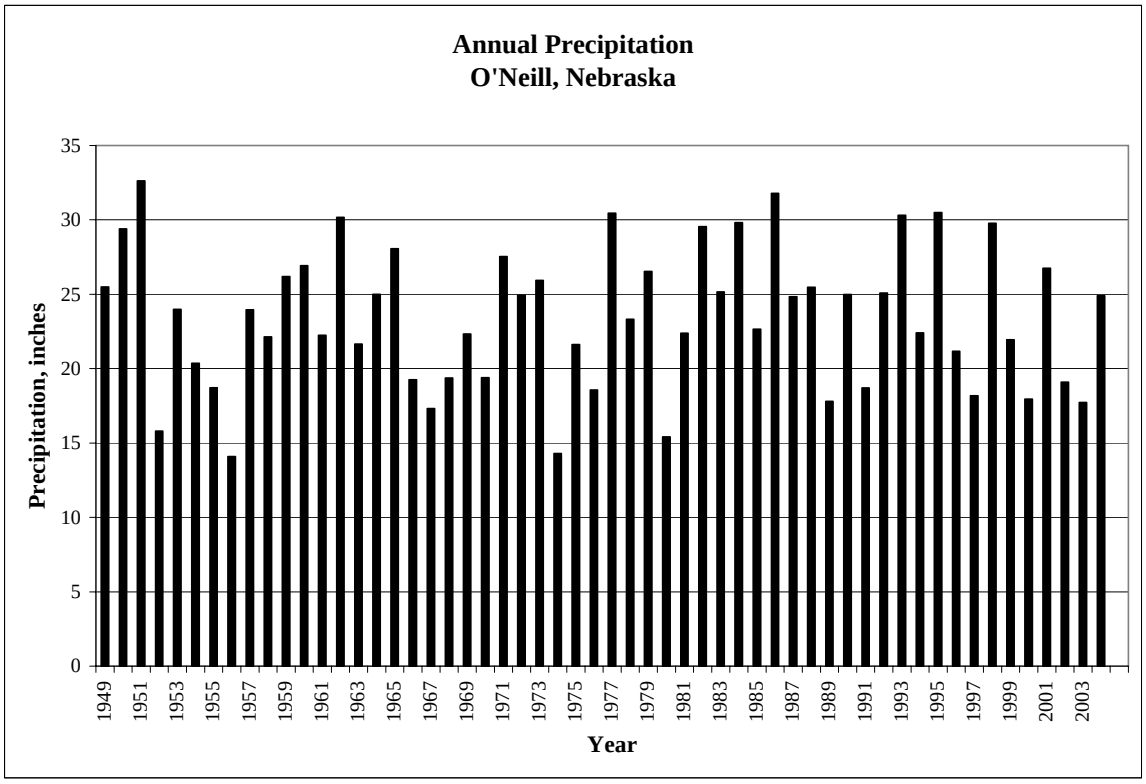


Figure E-9. Growing Season (May-September) Precipitation at O'Neill.

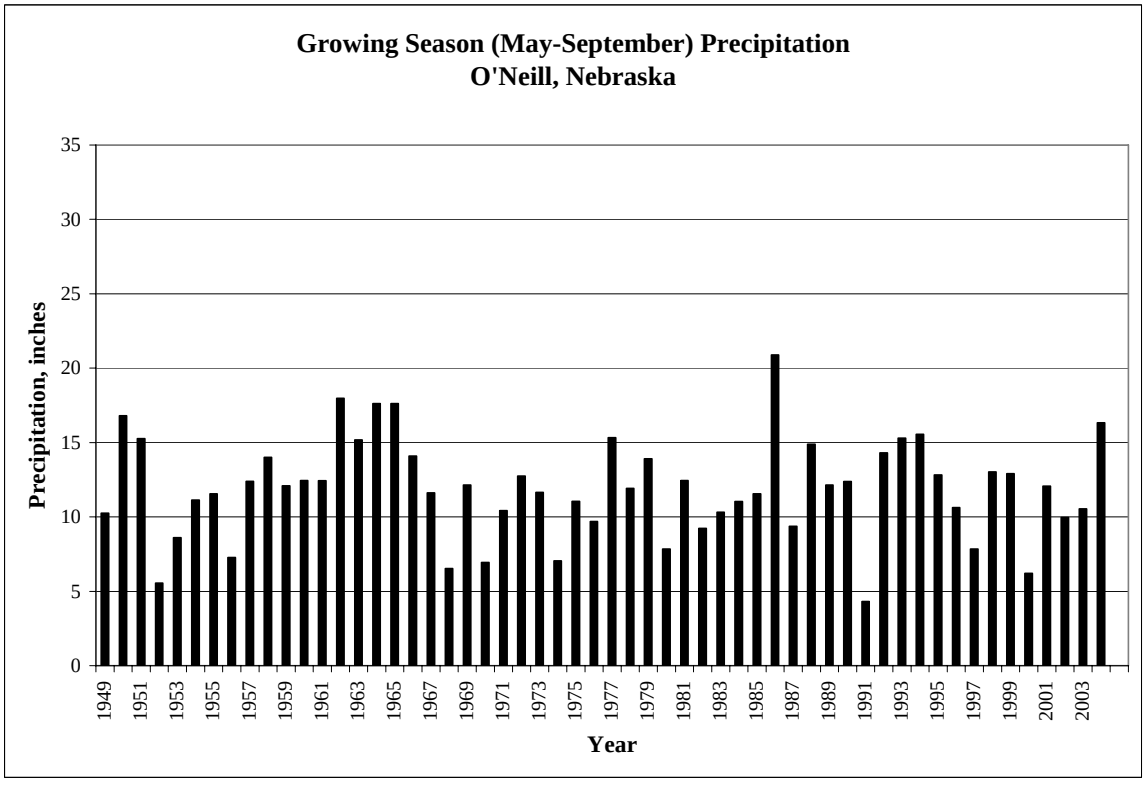


Figure E-10. Annual Precipitation at Wayne.

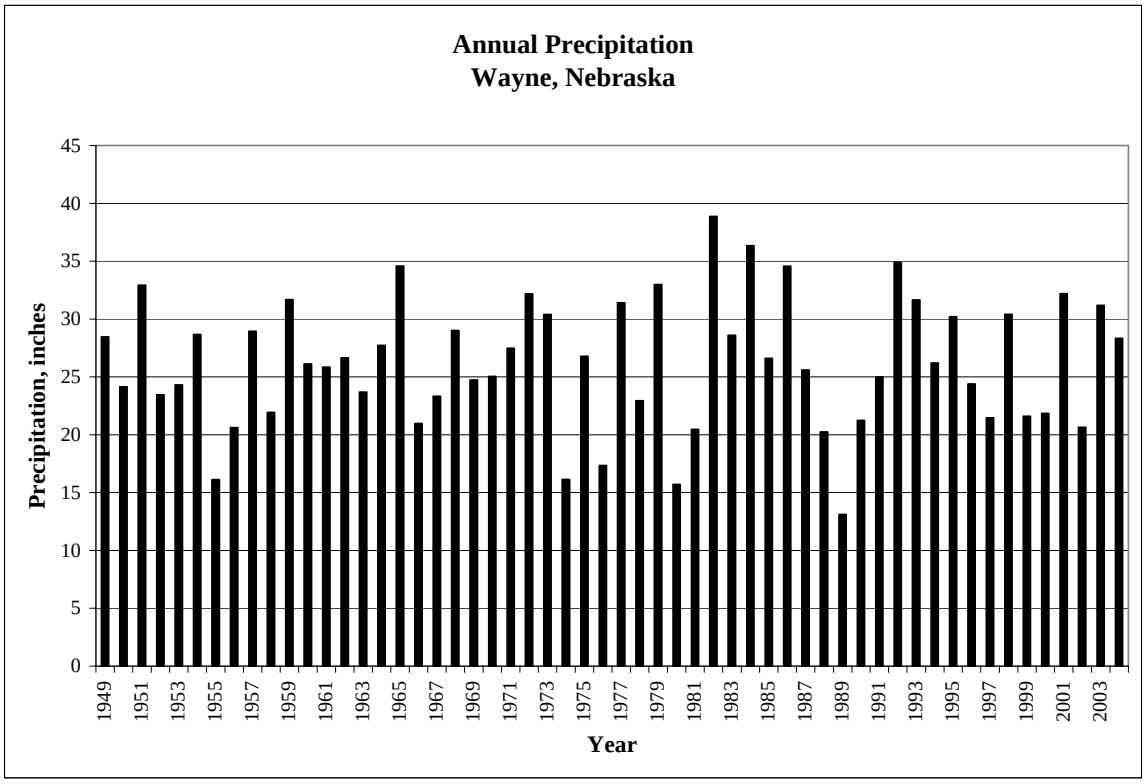


Figure E-11. Growing Season (May-September) Precipitation at Wayne.

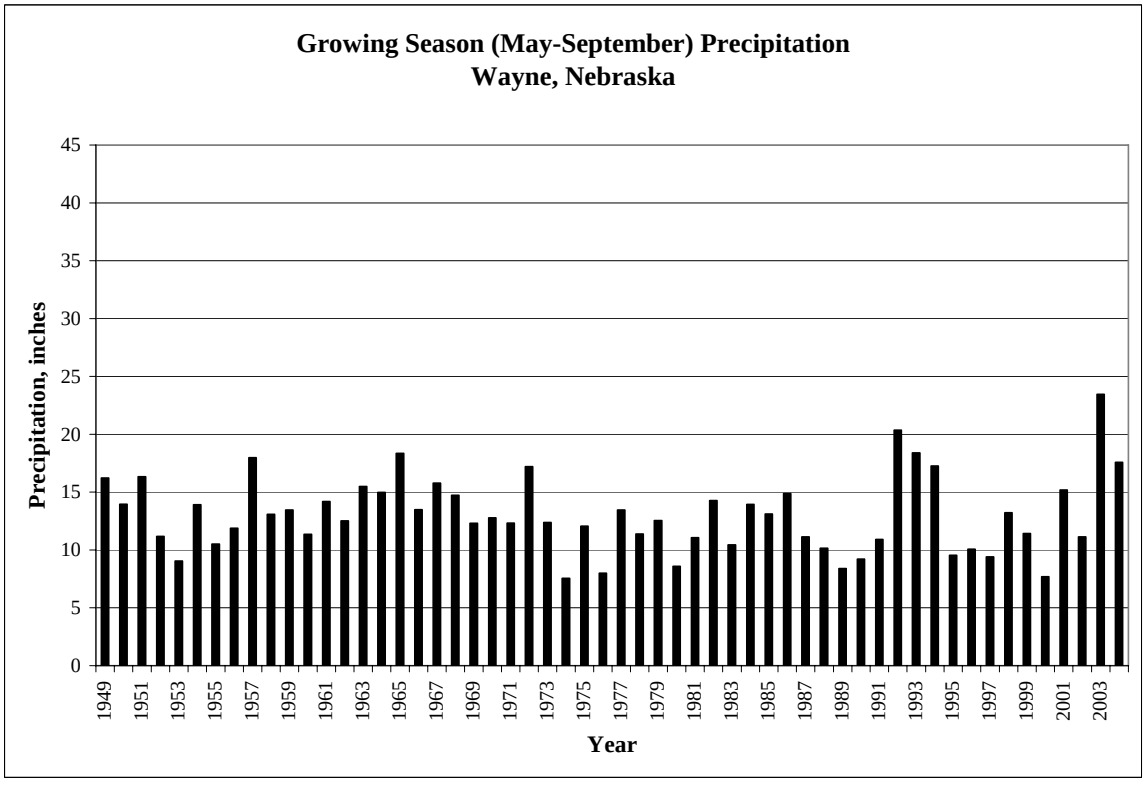


Figure E-12. Annual Precipitation at West Point.

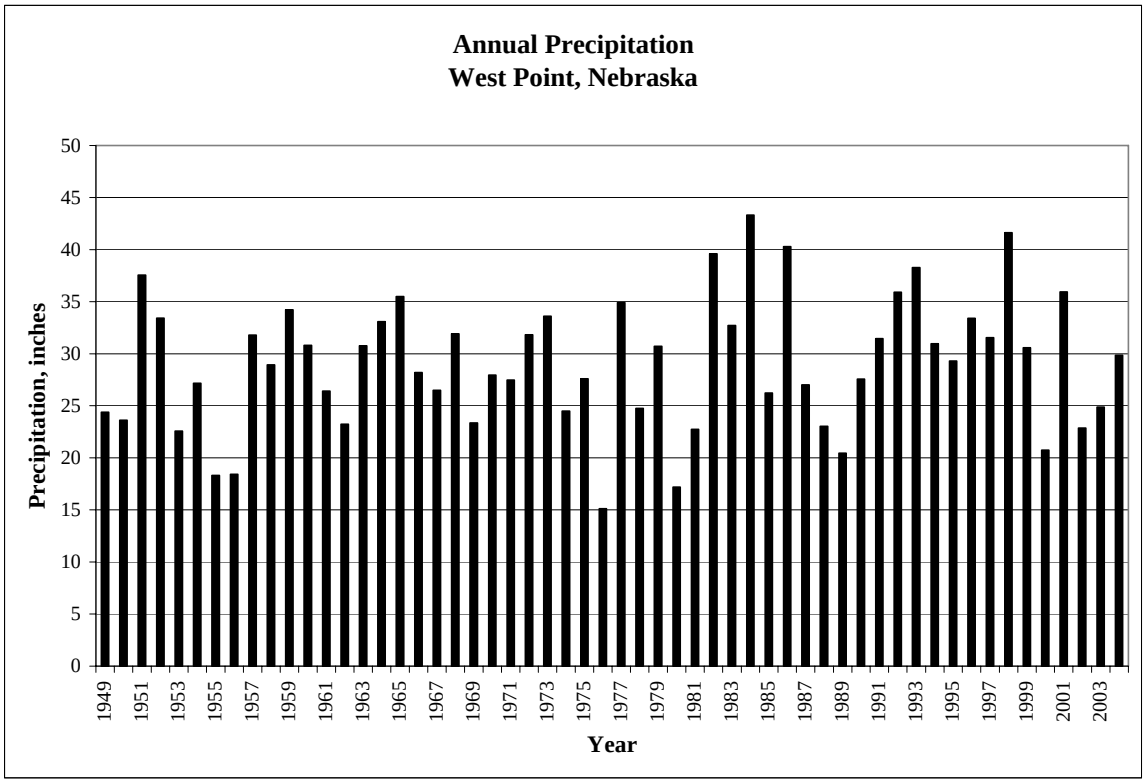
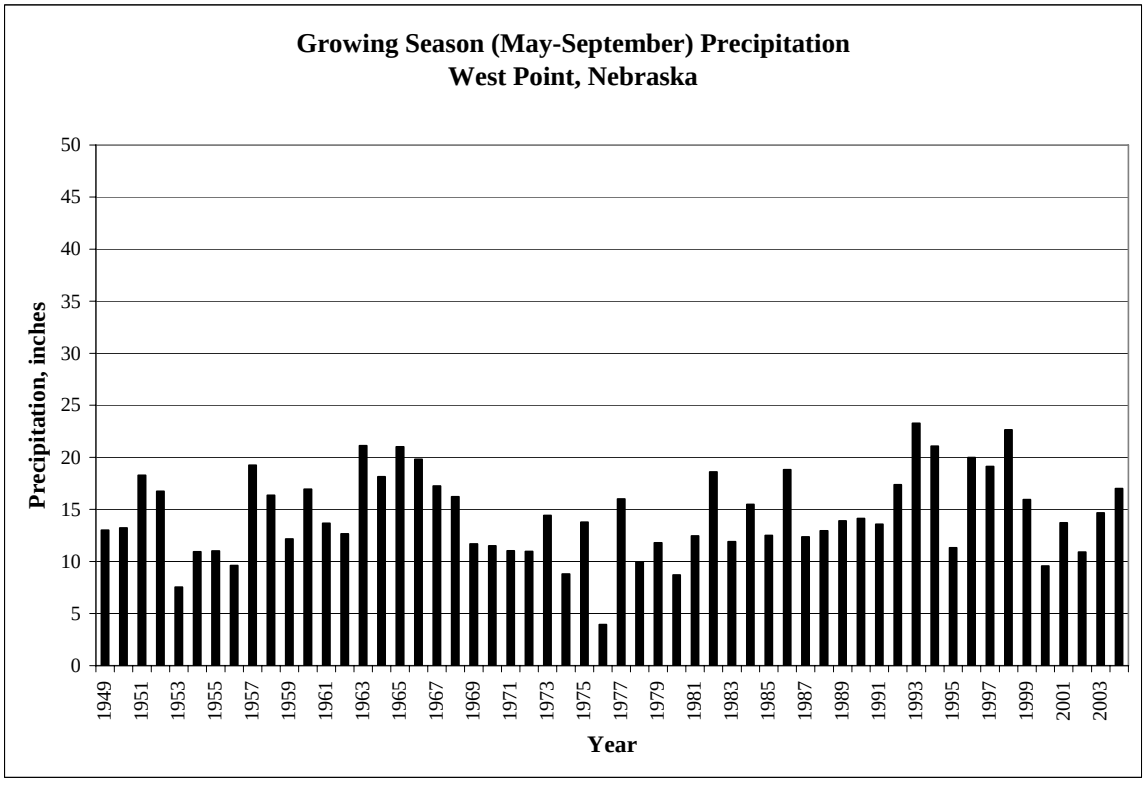


Figure E-13. Growing Season (May-September) Precipitation at West Point.



Glacial Till

ELKHORN RIVER BASIN

Planning and Assistance Division

N
W E
S

LEWIS & CLARK NRD
CEDAR
DIXON
LOWER ELKHORN NRD
DAKOTA
ROCK
HOLT
UPPER ELKHORN NRD
PIERCE
ANTELOPE
WAYNE
THURSTON
PAPIO-MISSOURI RIVER NRD
WHEELER
MADISON
STANTON
CUMING
BURT
BOONE
WASHINGTON
DODGE
COLFAX
PLATTE
LOWER PLATTE NORTH NRD
DOUGLAS
SARPY

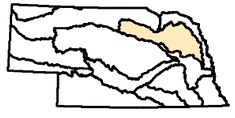
Explanation

- Elkhorn Basin
- Glacial Till

Cultural Features

- County Boundary
- State Boundary
- NRD Boundary

Location Map



0 4 8 16 24 32 **Miles**

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Glacial till information provided by the UNL Conservation and Survey Division: http://csd.unl.edu/general/gis-datasets.asp.

Base map produced by Josh Lear, February 4, 2005
Base map approved February 4, 2005
Glacial till map produced by Kevin J. Schwartman, October 7, 2005

Figure E-16.

Table E-1. – Aquifers in unconsolidated surficial deposits, (modified from Brogden, Shaffer and Engberg, 1976; Newport, 1957; LENRD, 1994; UENRD, 1995)

System	Hydrogeologic unit	Character and description	Maximum thickness, in feet	Hydrogeologic characteristics
Recent	Alluvium, loess, dune sand and soil	Clay, silt, sand and gravel alluvium in reworked stream-valley lands and sand and gravel in stream channels. Loess deposited on valley terraces and upland surfaces.	30	Not an important source of water except in areas where the water table is close to the land surface.
Quaternary	Peorian Loess	Wind deposits of massive clay on uplands and on terraces; some dune sand.	45	Yields water slowly to wells in areas where it occurs below the water table.
	Todd Valley Formation	Eolian or alluvial sand and gravel. Dune-like topography on upper surfaces.	50	May yield water to wells where it occurs below the water table.
	Loveland Formation	Stratified silt and clay with fine sand laminae in valleys. Massive silt and clay (loess) in uplands. Capped with paleosol.	50	Yields water slowly to wells in areas where it occurs below the water table.
	Crete Formation	Sand and gravel deposited as channel fill. Modified by local materials. Generally occurs as buried channels. Upland equivalent is a very thin deposit of boulders and gravel.	30	May yield water to wells in areas where it occurs below the water table.
	Kansan (Glacial) Drift	Boulder till with a high percentage of Sioux Quartzite fragments and thick oxidized and leached material.	100	Not an important source of water but may yield small amounts of water in some areas.
	Grand Island Formation	Sand and gravel deposited by streams. Fine sand near top with some glacial outwash.	75	Yields abundant good quality water to wells in areas where it occur below the water table.
	Holdrege Formation	Fluvial sand and gravel generally deposited in pre-Pleistocene valleys.	15	Yields abundant supplies of good quality water to wells.

Table E-2. – Characteristics of bedrock aquifers (modified from Keech and Dreeszen, 1959, 1968; LBNRD, 1995)

System	Hydrogeologic unit	Character and description	Maximum thickness, in feet	Hydrogeologic characteristics
Tertiary	Ogallala Group	Fluvial gravel, sand, silt and clay. Generally occurs in thin lenses that interfinger within a short distance. Moderately to well cemented in places by calcium carbonate forming resistant ledges.	200	Yields abundant supplies of good quality water to wells. More important in western part of the basin where it is thicker than in the eastern part of the basin.
Cretaceous	Pierre Shale	Shale that is generally weathered at the top. Some areas with overlying clay may be made up of weathered Pierre Shale.	400	Not an important source of water but may yield small amounts of poor quality water to wells were fractured or along bedding planes and thin isolated sand beds.
	Niobrara Formation	Soft Shaley limestone or impure chalk with some clay, fine sand and limy shale beds.	250	Not an important sources of water but may yield small amounts of water to wells.
	Dakota Sandstone	Fine to medium-grained sandstone interbedded with clay shale, sandy shale, siltstone and claystone. May be massive or cross-bedded, common ironstone zones. Sandstones are slightly to moderately permeable.	600	Will yield small amounts of poor quality water. May be too highly mineralized for most uses.

Planning and Assistance Division

Bedrock Geology

ELKHORN RIVER BASIN

N
W E
S

LEWIS & CLARK NRD
CEDAR
DIXON
ROCK
HOLT
LOWER ELKHORN NRD
DAKOTA
UPPER ELKHORN NRD
ANTELOPE
PIERCE
WAYNE
THURSTON
PAPIO-MISSOURI RIVER NRD
WHEELER
MADISON
STANTON
CUMING
BURT
BOONE
WASHINGTON
DODGE
PLATTE
COLFAX
LOWER PLATTE NORTH NRD
DOUGLAS
SARPY

Explanation

- Elkhorn Basin
- **Bedrock Geology**
  - Ogallala
  - Pierre
  - Niobrara
  - Carlile
  - Greenhorn-Graneros
  - Dakota
  - Wabaunsee
  - Shawnee
  - Douglas
  - Lansing
  - Kansas City
  - Marmaton
- **Cultural Features**
  - County Boundary
  - State Boundary
  - NRD Boundary

Location Map

0 4 8 16 24 32 Miles

Bedrock geology information provided by the UNL Conservation and Survey Division: http://csd.unl.edu/general/gis-datasets.asp.

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Figure E-17.

Base map produced by Josh Lear, February 4, 2005
Base map approved February 4, 2005
Bedrock geology map produced by Kevin J. Schwartman, October 7, 2005

Planning and Assistance Division

Saturated Thickness

ELKHORN RIVER BASIN

N
W E
S

LEWIS & CLARK NRD
CEDAR
DIXON
LOWER ELKHORN NRD
DAKOTA
ROCK
HOLT
UPPER ELKHORN NRD
ANTELOPE
PIERCE
WAYNE
THURSTON
PAPIO-MISSOURI RIVER NRD
WHEELER
MADISON
STANTON
CUMING
BURT
BOONE
WASHINGTON
DODGE
PLATTE
COLFAX
LOWER PLATTE NORTH NRD
DOUGLAS
SARPY

Explanation

- Elkhorn Basin
- Saturated Thickness
  - Absent
  - 0 ft.
  - 100 ft.
  - 200 ft.
  - 300 ft.
  - 400 ft.
  - 500 ft.
  - 600 ft.
  - 700 ft.
  - 800 ft.
- **Cultural Features**
  - County Boundary
  - State Boundary
  - NRD Boundary

Location Map

0 4 8 16 24 32 **Miles**

Saturated thickness information provided by the UNL Conservation and Survey Division: http://csd.unl.edu/general/gis-datasets.asp.

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Figure E-18.

Base map produced by Josh Lear, February 4, 2005
Base map approved February 4, 2005
Saturated Thickness map produced by Kevin J. Schwartman, October 7, 2005

Planning and Assistance Division

Depth to Water

ELKHORN RIVER BASIN

N
W E
S

LEWIS & CLARK NRD
CEDAR
DIXON
LOWER ELKHORN NRD
DAKOTA
THURSTON
PAPIO-MISSOURI RIVER NRD
ROCK
HOLT
UPPER ELKHORN NRD
ANTELOPE
PIERCE
WAYNE
WHEELER
MADISON
STANTON
CUMING
BURT
BOONE
WASHINGTON
DODGE
PLATTE
COLFAX
LOWER PLATTE NORTH NRD
DOUGLAS
SARPY

Explanation

- Elkhorn Basin

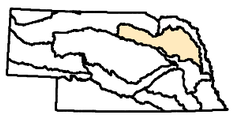
Depth to Water

- 0 - 50 feet
- 50 - 100 feet
- 100-200 feet
- > 200 feet

Cultural Features

- County Boundary
- State Boundary
- NRD Boundary

Location Map



0 4 8 16 24 32 Miles

Depth to water information provided by the UNL Conservation and Survey Division: http://csd.unl.edu/general/gis-datasets.asp.

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Figure E-19.

Base map produced by Josh Lear, February 4, 2005
Base map approved February 4, 2005
Bedrock geology map produced by Kevin J. Schwartman, October 7, 2005

Planning and Assistance Division

Transmissivity

ELKHORN RIVER BASIN

N
W E
S

LEWIS & CLARK NRD
CEDAR
DIXON
ROCK
HOLT
LOWER ELKHORN NRD
DAKOTA
UPPER ELKHORN NRD
ANTELOPE
PIERCE
WAYNE
THURSTON
PAPIO-MISSOURI RIVER NRD
WHEELER
MADISON
STANTON
CUMING
BURT
BOONE
WASHINGTON
DODGE
PLATTE
COLFAX
LOWER PLATTE NORTH NRD
DOUGLAS
SARPY

Explanation

- Elkhorn Basin

Transmissivity

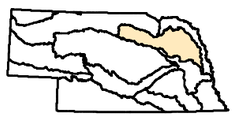
Thousands of gal/day/ft

- 20
- 50
- 100
- 150
- 200
- 250
- 300

Cultural Features

- County Boundary
- State Boundary
- NRD Boundary

Location Map



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Transmissivity information provided by the UNL Conservation and Survey Division in: Summerside, S., Olafsen-Lackey, S., Goeke, J., and Myers, W., 2005, Mapping of Aquifer Properties – Transmissivity and Specific Yield – for Selected River Basins in Central and Eastern Nebraska.

0 4 8 16 24 32 Miles

Base map produced by Josh Lear, February 4, 2005
Base map approved February 4, 2005
Transmissivity map produced by Kevin J. Schwartman, September 1, 2005

Figure E-20.

Planning and Assistance Division

Specific Yield

ELKHORN RIVER BASIN

N
W E
S

LEWIS & CLARK NRD
CEDAR
DIXON
LOWER ELKHORN NRD
DAKOTA
ROCK
HOLT
UPPER ELKHORN NRD
ANTELOPE
PIERCE
WAYNE
THURSTON
PAPIO-MISSOURI RIVER NRD
WHEELER
MADISON
STANTON
CUMING
BURT
BOONE
WASHINGTON
DODGE
PLATTE
COLFAX
LOWER PLATTE NORTH NRD
DOUGLAS
SARPY

Explanation

- Elkhorn Basin

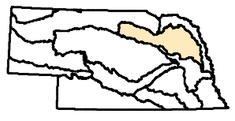
Specific Yield (Percent)

- 5
- 10
- 15
- 17
- 20
- 25

Cultural Features

- County Boundary
- State Boundary
- NRD Boundary

Location Map



0 4 8 16 24 32 **Miles**

Specific yield information provided by the UNL Conservation and Survey Division in: Summerside, S., Olafsen-Lackey, S., Goeke, J., and Myers, W., 2005, Mapping of Aquifer Properties – Transmissivity and Specific Yield – for Selected River Basins in Central and Eastern Nebraska.

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Base map produced by Josh Lear, February 4, 2005
Base map approved February 4, 2005
Specific yield map produced by Kevin J. Schwartman, October 7, 2005

Figure E-21.

Planning and Assistance Division

1995 Ground Water Table

ELKHORN RIVER BASIN

N
W E
S

LEWIS & CLARK NRD
CEDAR
DIXON
DAKOTA
THURSTON
PAPIO-MISSOURI RIVER NRD
LOWER ELKHORN NRD
UPPER ELKHORN NRD
ROCK
HOLT
ANTELOPE
PIERCE
WAYNE
WHEELER
MADISON
STANTON
CUMING
BURT
BOONE
WASHINGTON
PLATTE
COLFAX
DODGE
LOWER PLATTE NORTH NRD
DOUGLAS
SARPY

2300 2450 2050 1850 900 1700 1500 1400 1350 1300 1250 1200 1050 1000 1600 1150 1100 1330 1170 1160 1380 1150 1110

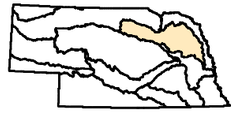
Explanation

- Elkhorn Basin
- 1995 Water Table
- Major Streams

Cultural Features

- County Boundary
- State Boundary
- NRD Boundary

Location Map



Water table information provided by the UNL Conservation and Survey Division: http://csd.unl.edu/general/gis-datasets.asp.

This map is intended to supply only general information concerning the matter stated in its title. Boundaries and the location of features portrayed on this map are not to be construed as legal boundaries or actual locations, and may change as additional or better data become available. User assumes all risks associated with interpretations of this map beyond its intended purpose.

0 4 8 16 24 32 **Miles**

Base map produced by Josh Lear, February 4, 2005
Base map approved February 4, 2005
Water table map produced by Kevin J. Schwartman, October 7, 2005

Figure E-22.

Department of Natural Resources

Planning and Assistance Division

Depletive Ground Water Wells

ELKHORN RIVER BASIN

N W E S

Middle Logan Creek
Logan Creek Dredge
North Fork Elkhorn River
Wayne
Norfolk
Elkhorn River
Big Cedar Creek
Columbus
Blair
Fremont
Omaha

Explanation

- Depletive Wells

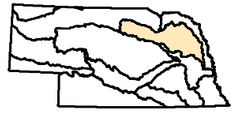
Surface Water Features

- Rivers
- Intermittent Streams
- Canals/Ditchs
- Lakes
- Elkhorn Basin

Cultural Features

- County Boundary
- State Boundary
- NRD Boundary
- Cities

Location Map



Depletive well infomation is from the DNR Registered Ground Water Well Database, as of January 2005 and include wells used for aquiculture, commercial, domestic, irrigation, public water supply, dewatering, stock and others except wells for non-consumptive uses.

0 4 8 16 24 32 Miles

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Base map produced by Josh Lear, February 4, 2005
Base map approved February 4, 2005
Depletive ground water wells map produced by Shuhai Zheng, October 6, 2005.

Figure E-23.

Department of Natural Resources

Planning and Assistance Division

High Capacity Wells by Completion Years

ELKHORN RIVER BASIN

N W E S

Middle Logan Creek
Logan Creek Dredge
North Fork Elkhorn River
Wayne
Norfolk
Elkhorn River
Big Cedar Creek
Blair
Columbus
Omaha

Explanation

Surface Water Features	High Capacity Wells	Cultural Features
Rivers	Pre - 1940 wells	County Boundary
Intermittent Streams	1940 - 1959 wells	State Boundary
Canals/Ditchs	1960 - 1979 wells	NRD Boundary
Lakes	1980 - 1999 wells	Cities
Elkhorn Basin	Post - 1999 wells	

Location Map

High Capacity well infomation is from the DNR Registered Ground Water Well Database, as of January 2005 and includes depletive wells with regisered pumping rates equal to or greater than 50 gpm.

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0 4 8 16 24 32 Miles

Base map produced by Josh Lear, February 4, 2005
Base map approved February 4, 2005
High capacity wells map produced by Shuhai Zheng, November 10, 2005.

Figure E-24.

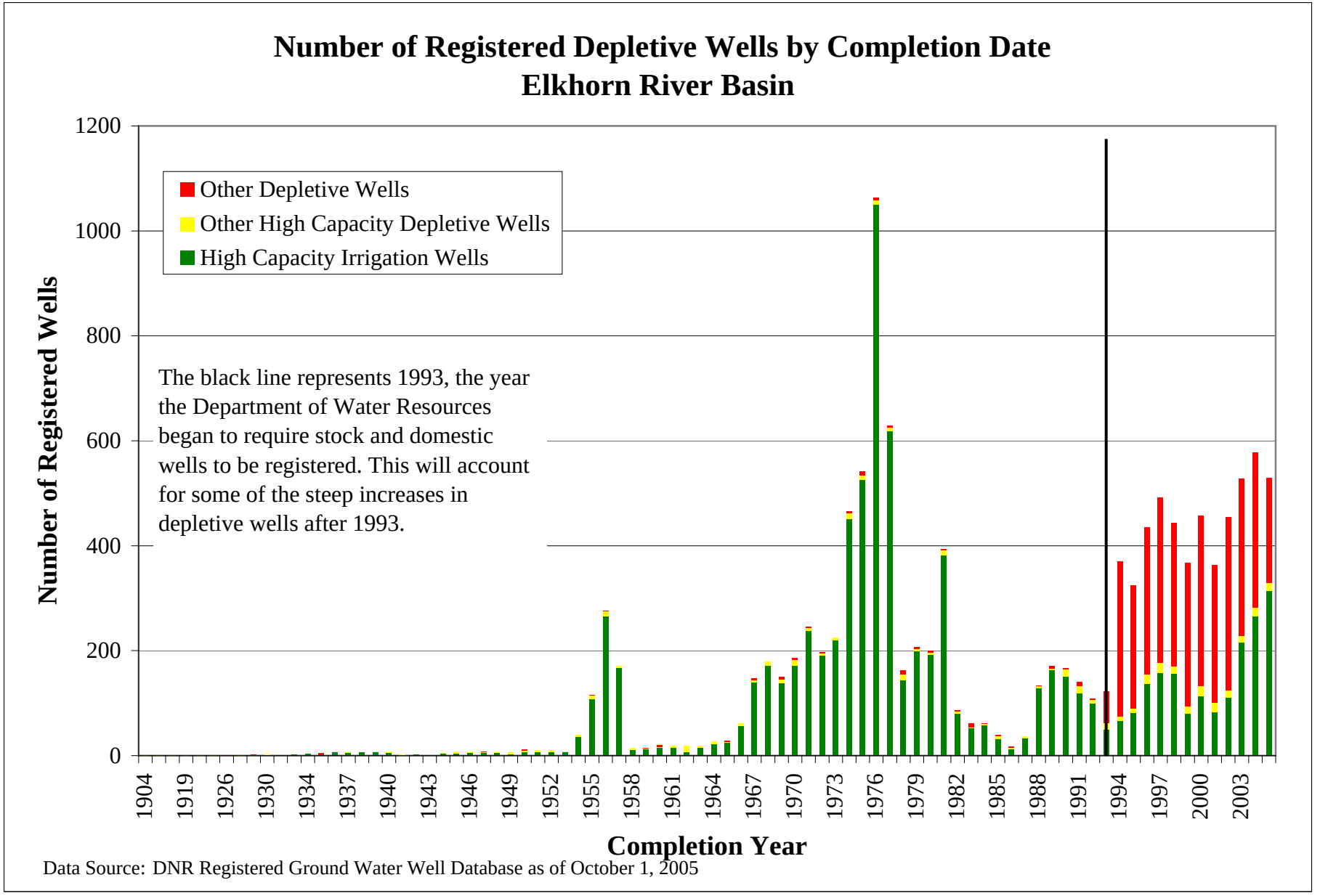


Figure E-25

By Shuhai Zheng, 11/15/2005

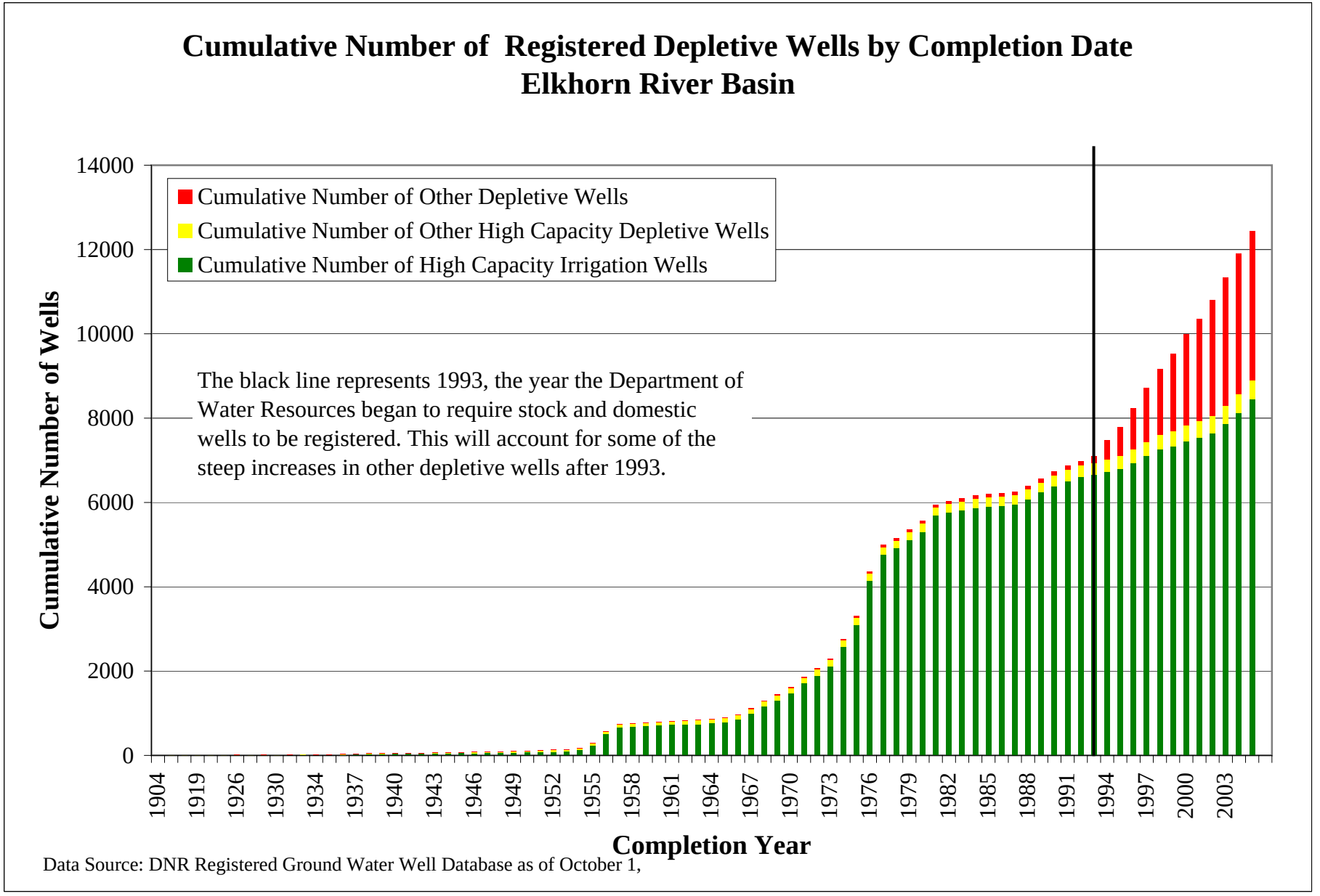


Figure E-26

By Shuhai Zheng, 11/15/2005

Table E-3. Average Irrigated Acreage 1950-2003 for Counties Fully or Partially in the Elkhorn River Basin

	Estimated Average Irrigated Acreage by County						
County Name	*Percent of County in Elkhorn Basin*	*1950-1959*	*1960-1969*	*1970-1979*	*1980-1989*	*1990-1999*	*2000-2003*
Antelope	72	3140	14709	89076	160910	184990	213225
Boone	2	10299	25671	63326	111210	141590	164400
Brown	<1	1995	10633	46396	52650	49940	47775
Burt	43	1381	5037	23483	39080	47950	55925
Cedar	29	963	2710	22303	54880	65180	78350
Colfax	57	6048	16812	31426	59530	59970	63850
Cuming	100	786	2352	11849	27020	36840	42875
Dakota	<1	489	1734	5431	10190	17000	18000
Dixon	28	105	599	5859	15650	17290	19025
Dodge	78	6865	19554	51683	80740	93890	104050
Douglas	21	825	2188	7555	12830	12640	9850
Garfield	4	3173	5654	12800	19450	14610	14650
Holt	54	2746	27950	133669	195120	210960	220725
Knox	7	677	3535	17682	35420	43430	49875
Madison	94	2219	8494	37086	70420	86440	102150
Pierce	99	1673	5891	42958	94670	104610	114725
Platte	16	10651	31718	77881	127710	161700	188775
Rock	58	115	1646	27958	38410	37150	36825
Sarpy	3	816	981	3597	5390	6690	6375
Stanton	100	1152	4391	13785	25280	26120	29000
Thurston	35	592	1277	3823	8470	6450	13275
Washington	30	512	1693	7132	17270	16340	17250
Wayne	100	227	761	5564	16680	24960	36075

Shuhai Zheng, November 29, 2005

	Estimated Average Irrigated Acreage by County						
County Name	*Percent of County in Elkhorn Basin*	*1950-1959*	*1960-1969*	*1970-1979*	*1980-1989*	*1990-1999*	*2000-2003*
Wheeler	20	442	1804	16334	41330	42820	44050
Total		**57890**	**197794**	**758656**	**1320310**	**1509560**	**1691075**
% Change from Previous 10 Years			241.67%	283.56%	74.03%	14.33%	12.02%

* The percentage is the percentage of the county area which is in the Elkhorn Basin. It does not necessarily represent the percentage of irrigated county acreage in the Elkhorn River Basin.

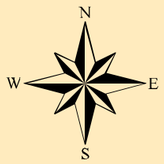
Data Source: http://www.usda.gov/nass/, National Agricultural Statistics Service**, U.S. Department of Agriculture**

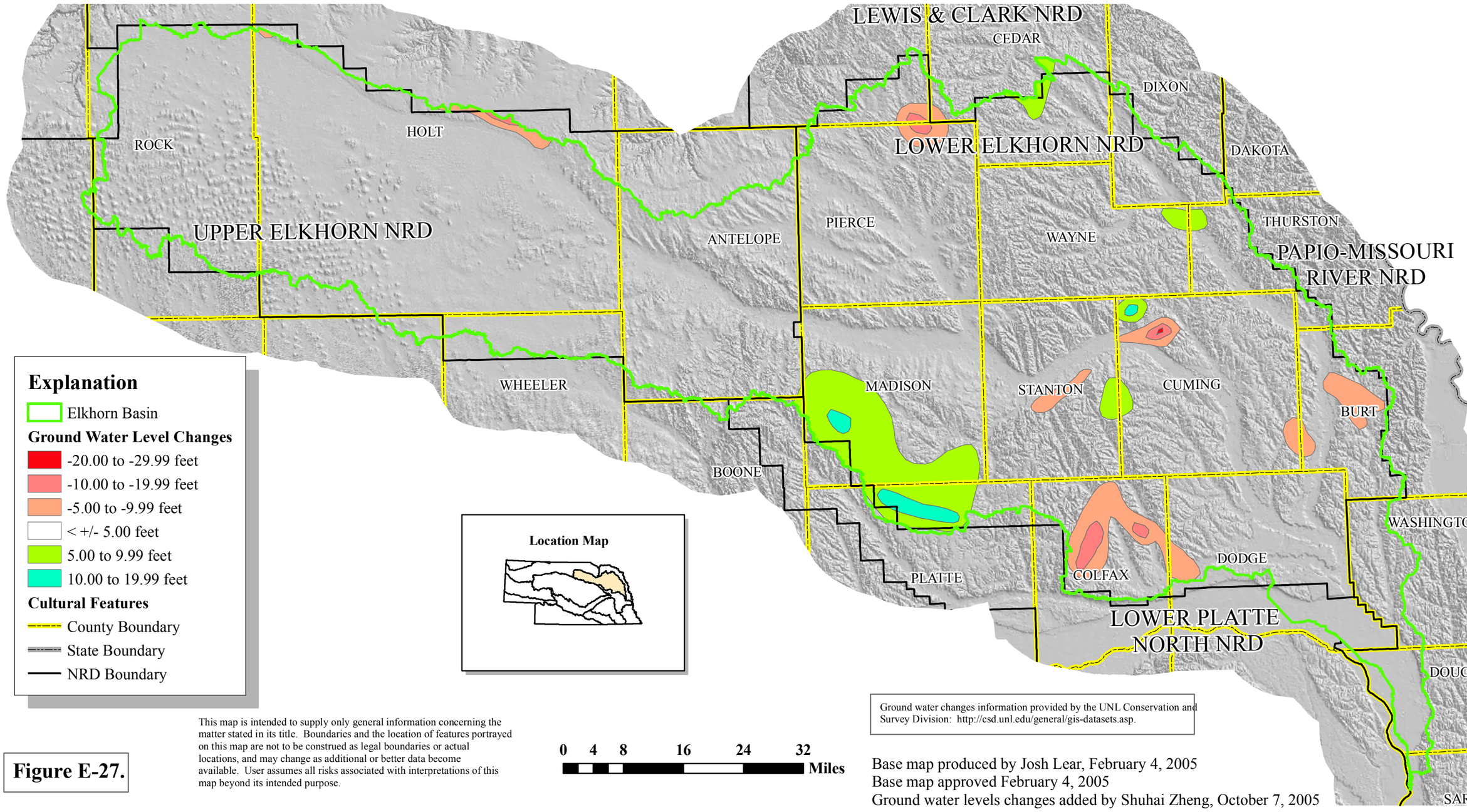
Shuhai Zheng, November 29, 2005

Planning and Assistance Division

Ground Water-level Changes Pre-development to 2005

ELKHORN RIVER BASIN





Explanation

- Elkhorn Basin

Ground Water Level Changes

- -20.00 to -29.99 feet
- -10.00 to -19.99 feet
- -5.00 to -9.99 feet
- < +/- 5.00 feet
- 5.00 to 9.99 feet
- 10.00 to 19.99 feet

Cultural Features

- County Boundary
- State Boundary
- NRD Boundary

Location Map

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0 4 8 16 24 32 Miles

Ground water changes information provided by the UNL Conservation and Survey Division: http://csd.unl.edu/general/gis-datasets.asp.

Base map produced by Josh Lear, February 4, 2005
Base map approved February 4, 2005
Ground water levels changes added by Shuhai Zheng, October 7, 2005

Figure E-27.

Planning and Assistance Division

Hydrograph Locations

ELKHORN RIVER BASIN

N
W E
S

LEWIS & CLARK NRD
CEDAR
DIXON
DAKOTA
THURSTON
PAPIO-MISSOURI RIVER NRD
LOWER ELKHORN NRD
Middle Logan Creek
Logan Creek Dredge
North Fork Elkhorn River
Elkhorn River
T 31N R 14W Section 27
T 30N R 10W Section 32
T 28N R 03W Section 33
T 26N R 12W Section 26
T 23N R 05W Section 02
T 22N R 01W Section 33
ROCK
HOLT
UPPER ELKHORN NRD
ANTELOPE
PIERCE
WAYNE
Big Cedar Creek
WHEELER
MADISON
STANTON
CUMING
BURT
BOONE
WASHINGTON
DODGE
PLATTE
COLFAX
LOWER PLATTE NORTH NRD
DOUGLAS
SARPY

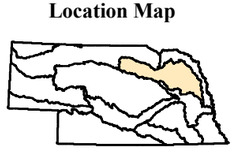
Explanation

- Elkhorn Basin
- Well Hydrographs

Cultural Features

- County Boundary
- State Boundary
- NRD Boundary

Location Map

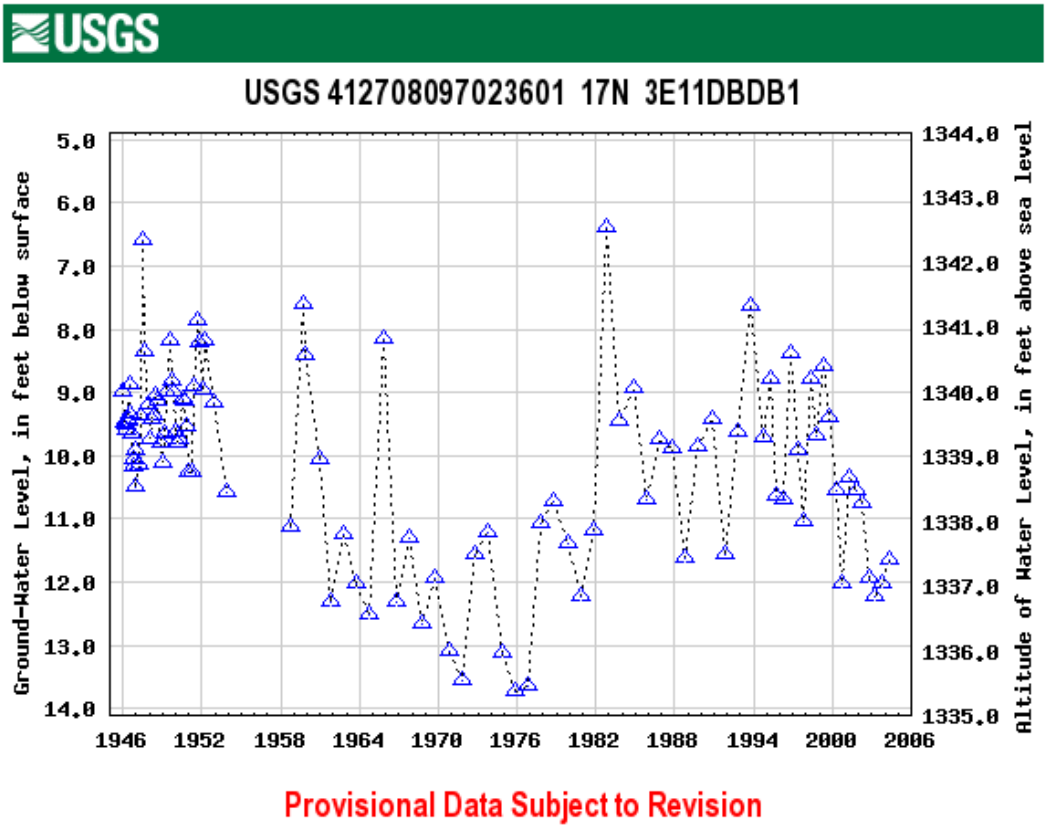


This map is intended to supply only general information concerning the matter stated in its title. Boundaries and the location of features portrayed on this map are not to be construed as legal boundaries or actual locations, and may change as additional or better data become available. User assumes all risks associated with interpretations of this map beyond its intended purpose.

0 4 8 16 24 32 Miles

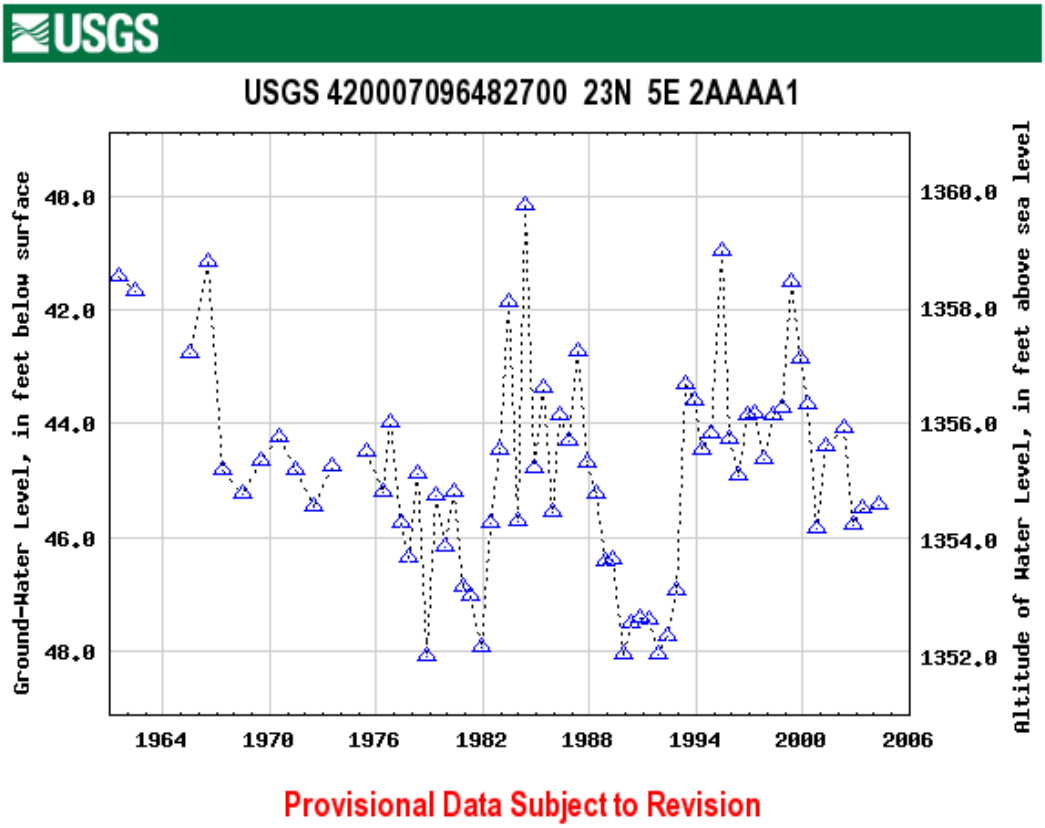
Base map produced by Josh Lear, February 4, 2005
Base map approved February 4, 2005
Stream gages map produced by Kevin Schwartman, November 2, 2005.

Figure E-28.



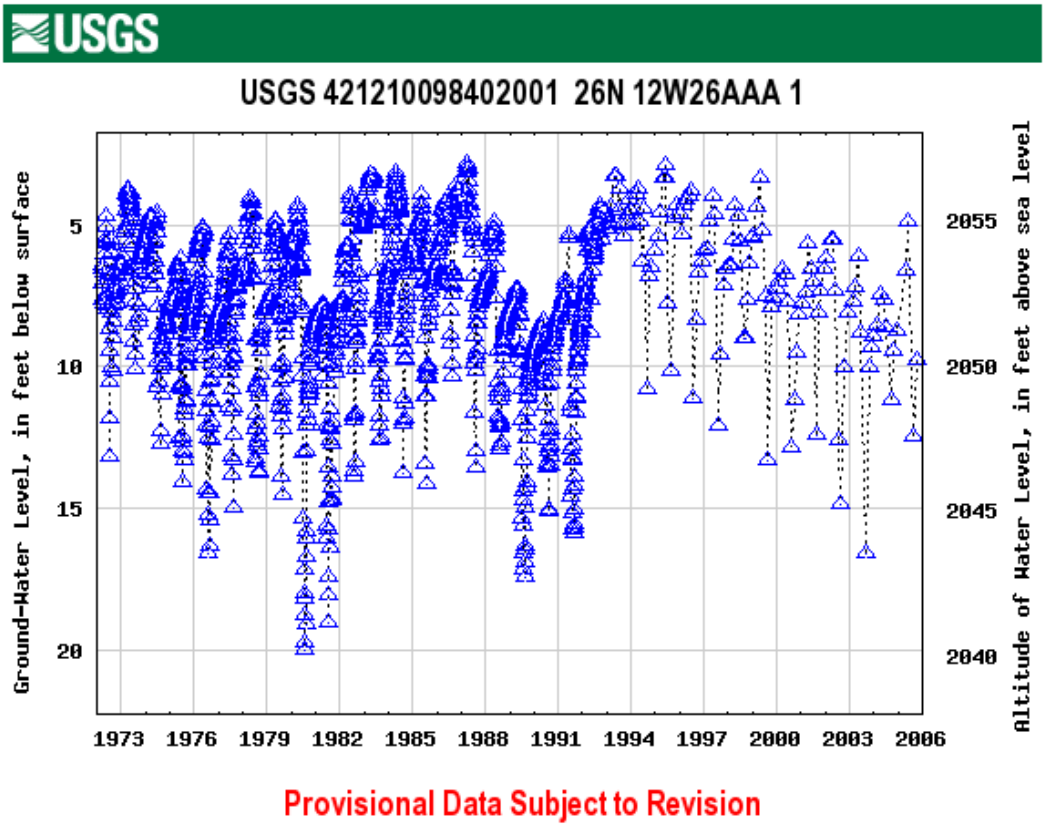
Colfax County, Nebraska
Hydrologic Unit Code 10200103
Latitude 41°27'26.12", Longitude 97°02'48.04" NAD27
Land-surface elevation 1,349.00 feet above sea level NGVD29
The depth of the well is 90.0 feet below land surface.
This well is completed in the QUATERNARY GRAVEL DEPOSITS local aquifer.

Figure E-29



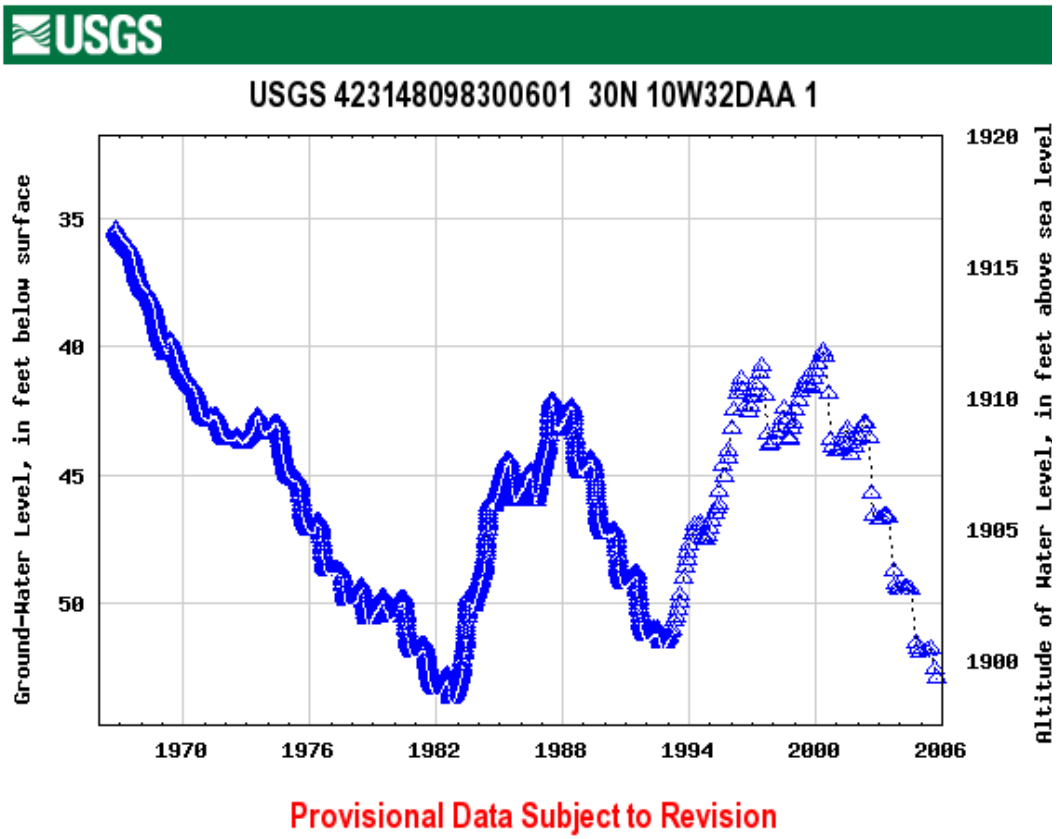
Cuming County, Nebraska
Hydrologic Unit Code 10220003
Latitude 42°00'07", Longitude 96°48'27" NAD27
Land-surface elevation 1,400. feet above sea level NGVD29
The depth of the well is 102 feet below land surface.
This well is completed in the QUATERNARY GRAVEL DEPOSITS local aquifer.

Figure E-30



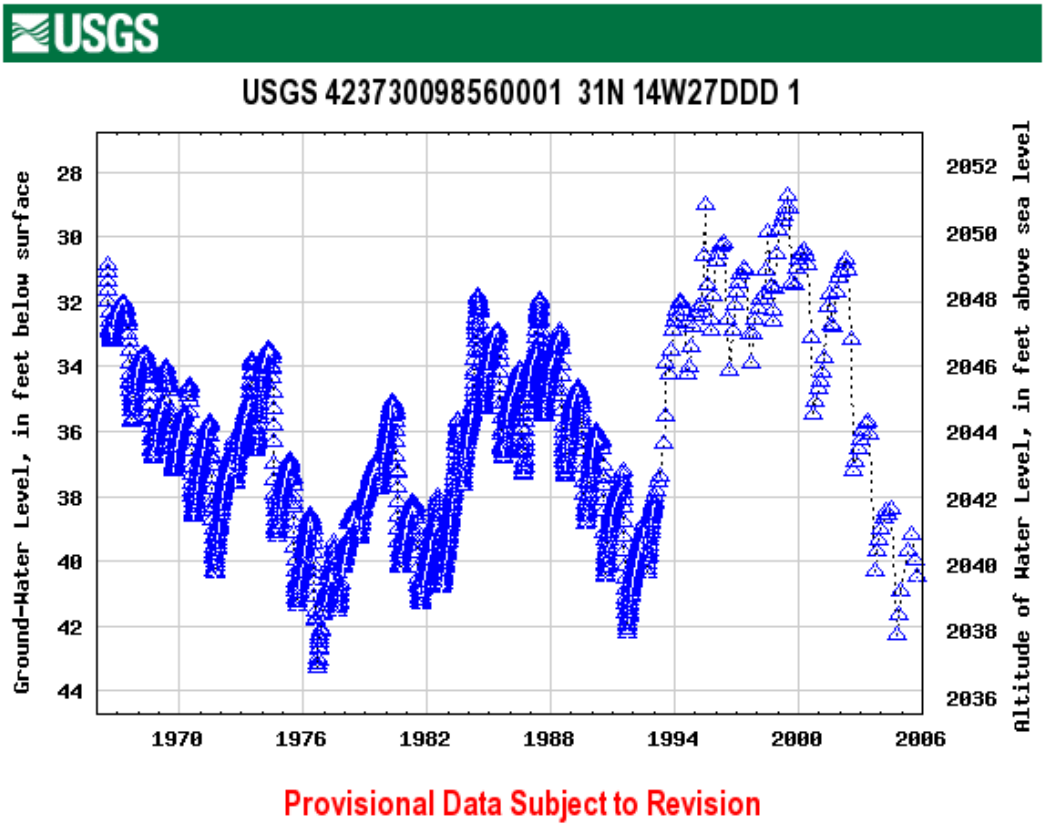
Holt County, Nebraska
Hydrologic Unit Code 10220001
Latitude 42°12'10", Longitude 98°40'20" NAD27
Land-surface elevation 2,060.00 feet above sea level NGVD29
The depth of the well is 140 feet below land surface.
This well is completed in the TERTIARY OGALLALA GROUP DEPOSITS (112SDGV) regional aquifer.

Figure E-31



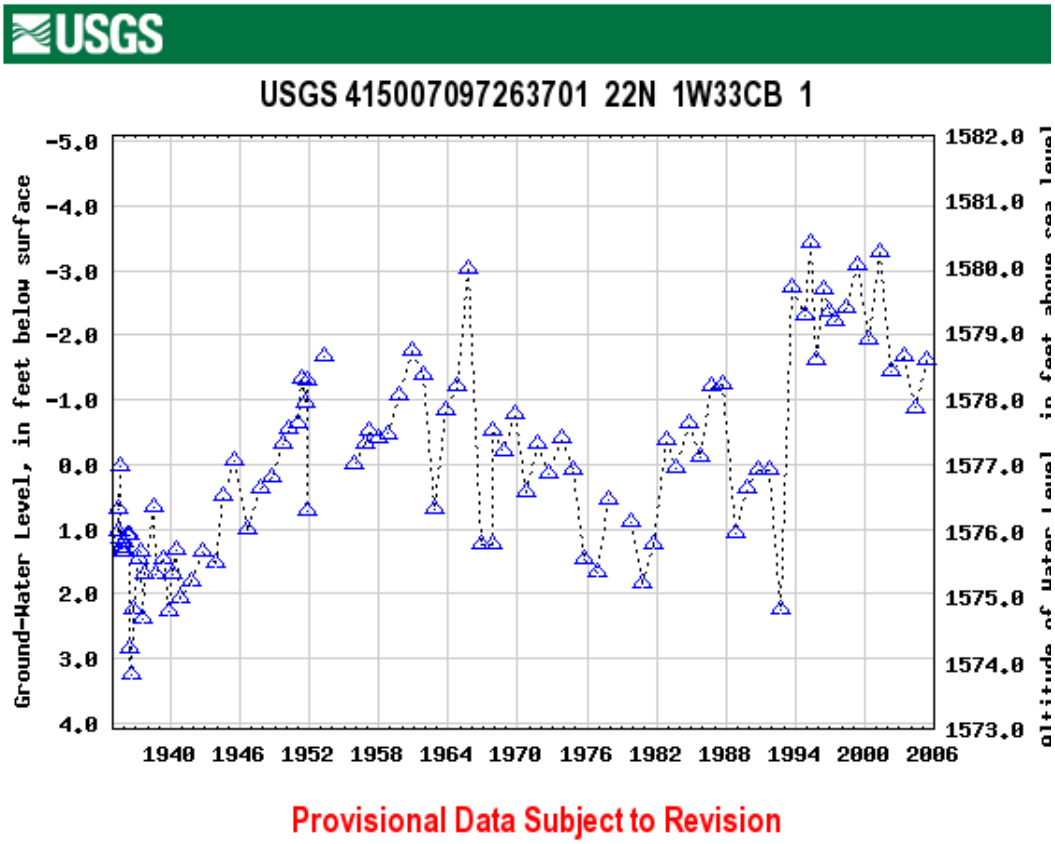
Holt County, Nebraska
Hydrologic Unit Code 10150007
Latitude 42°31'48", Longitude 98°30'06" NAD27
Land-surface elevation 1,952.00 feet above sea level NGVD29
The depth of the well is 85.0 feet below land surface.
This well is completed in the QUATERNARY SAND AND GRAVEL DEPOSITS (112SDGV) local aquifer.

Figure E-32



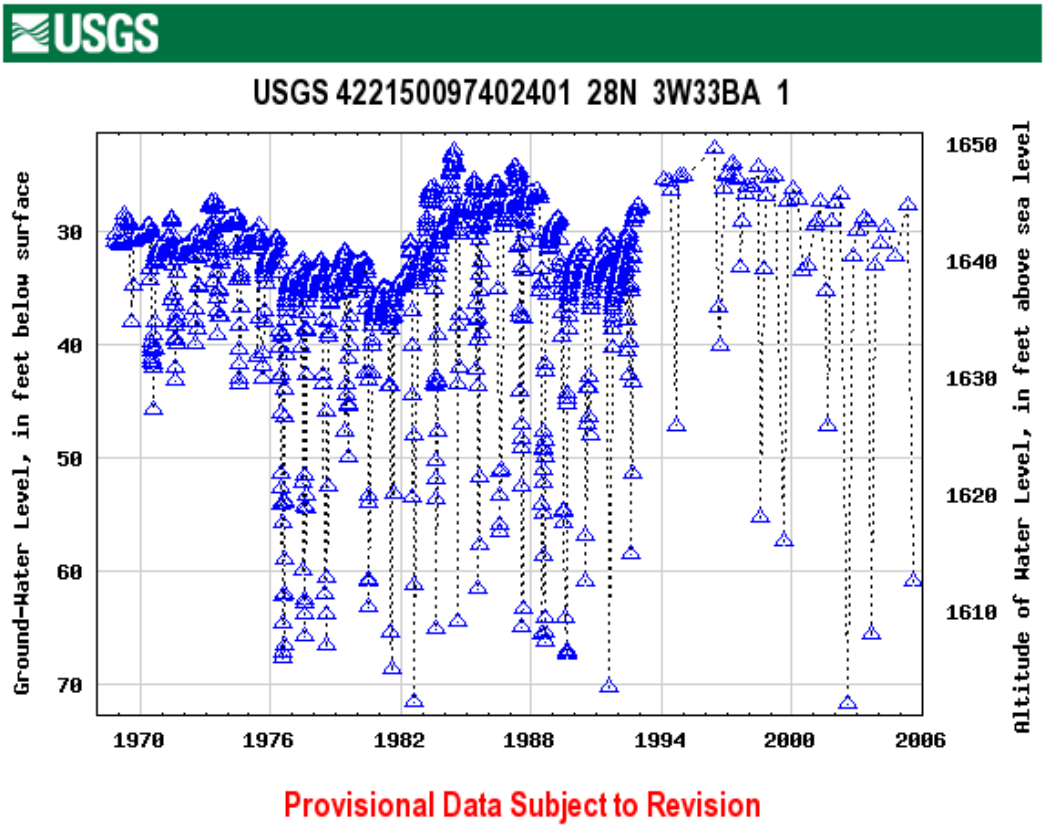
Holt County, Nebraska
Hydrologic Unit Code 10150007
Latitude 42°37'30", Longitude 98°56'00" NAD27
Land-surface elevation 2,080.00 feet above sea level NGVD29
The depth of the well is 72.0 feet below land surface.
This well is completed in the QUATERNARY SAND AND GRAVEL DEPOSITS (112SDGV) local aquifer.

Figure E-33



Madison County, Nebraska
Hydrologic Unit Code 10220003
Latitude 41°50'07", Longitude 97°26'37" NAD27
Land-surface elevation 1,577.00 feet above sea level NGVD29
The depth of the well is 60.0 feet below land surface.
This well is completed in the QUATERNARY SAND DEPOSITS (112SDGV) local aquifer.

Figure E-34



Pierce County, Nebraska
Hydrologic Unit Code 10220002
Latitude 42°21'50", Longitude 97°40'24" NAD27
Land-surface elevation 1,673.00 feet above sea level NGVD29
The depth of the well is 121 feet below land surface.
This well is completed in the QUATERNARY SAND AND GRAVEL DEPOSITS (112SDGV) local aquifer.

Figure E-35

Department of Natural Resources

Planning and Assistance Division

Stream Gages

ELKHORN RIVER BASIN

N
W E
S

LEWIS & CLARK NRD
CEDAR
DIXON
DAKOTA
THURSTON
PAPIO-MISSOURI RIVER NRD
LOWER ELKHORN NRD
ROCK
HOLT
ATKINSON, NE
Elkhorn River
Middle Logan Creek
Logan Creek Dredge
North Fork Elkhorn River
UPPER ELKHORN NRD
EWING, NE
SOUTH FORK ELKHORN RIVER AT EWING, NE
ANTELOPE
PIERCE
WAYNE
WILLOW CREEK NEAR FOSTER, NE
PIERCE, NE
PENDER, NE
NELIGH, NE
Big Cedar Creek
NORFOLK, NE
Elkhorn River
WHEELER
MADISON
STANTON
CUMING
WEST POINT, NE
BURT
UNION CREEK AT MADISON, NE
BEAVER CREEK AT LORETTO, NE
BOONE
UEHLING, NE
PEBBLE CREEK AT SCHRIBNER, NE
WASHINGTON
DODGE
MAPLE CREEK NEAR NICKERSON, NE
PLATTE
COLFAX
SHELL CREEK NEAR COLUMBUS, NE
LOWER PLATTE NORTH NRD
DOUGLAS
WATERLOO, NE
SARPY

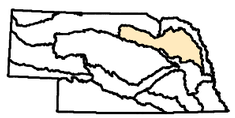
Explanation

- Elkhorn Basin
- Stream Gages

Cultural Features

- County Boundary
- State Boundary
- NRD Boundary

Location Map



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0 4 8 16 24 32 Miles

Base map produced by Josh Lear, February 4, 2005
Base map approved February 4, 2005
Stream gages map produced by Jeff Shafer, October 19, 2005.

Figure E-36.

Figure E-37. Annual Flows, South Fork of the Elkhorn River at Ewing.

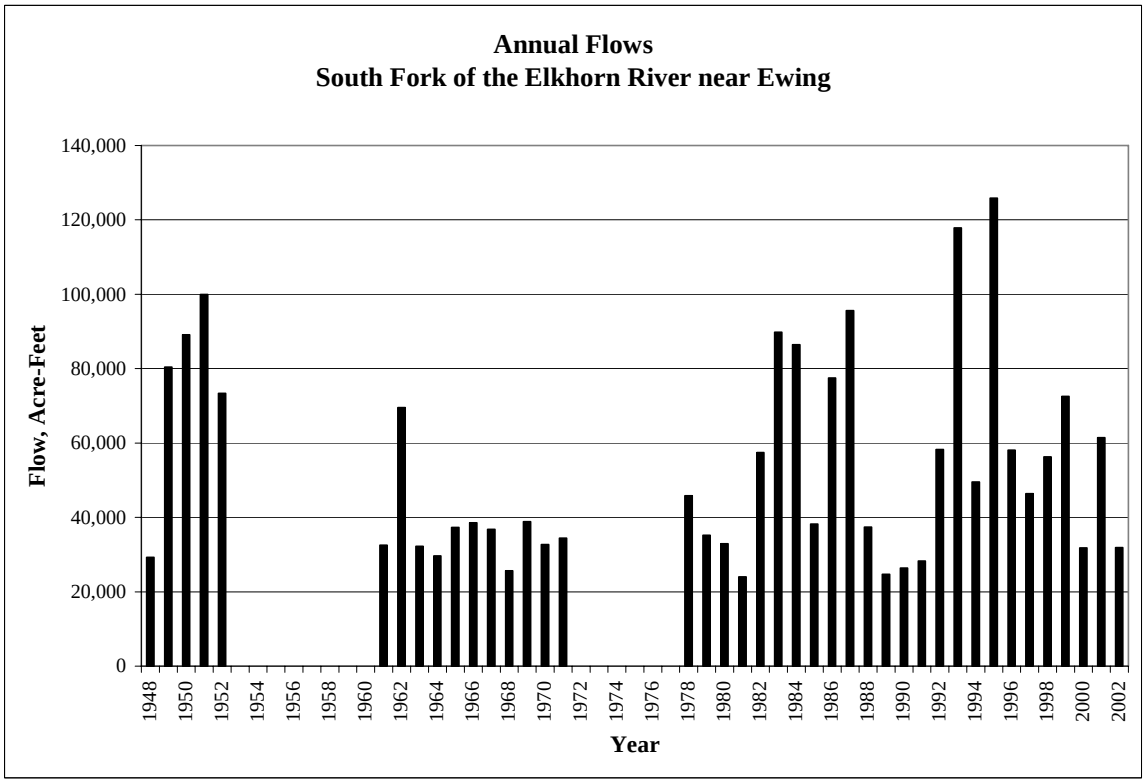


Figure E-38. Annual Flows, Willow Creek near Foster.

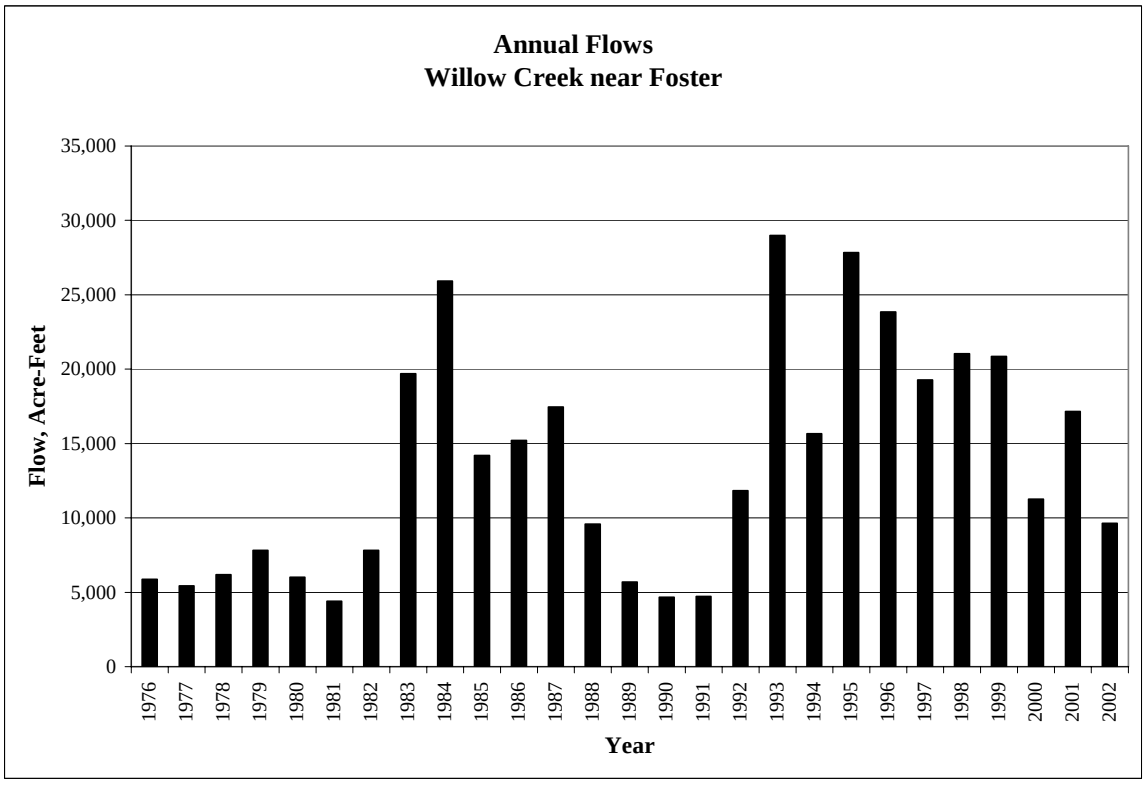


Figure E-39. Annual Flows, North Fork of the Elkhorn River near Pierce.

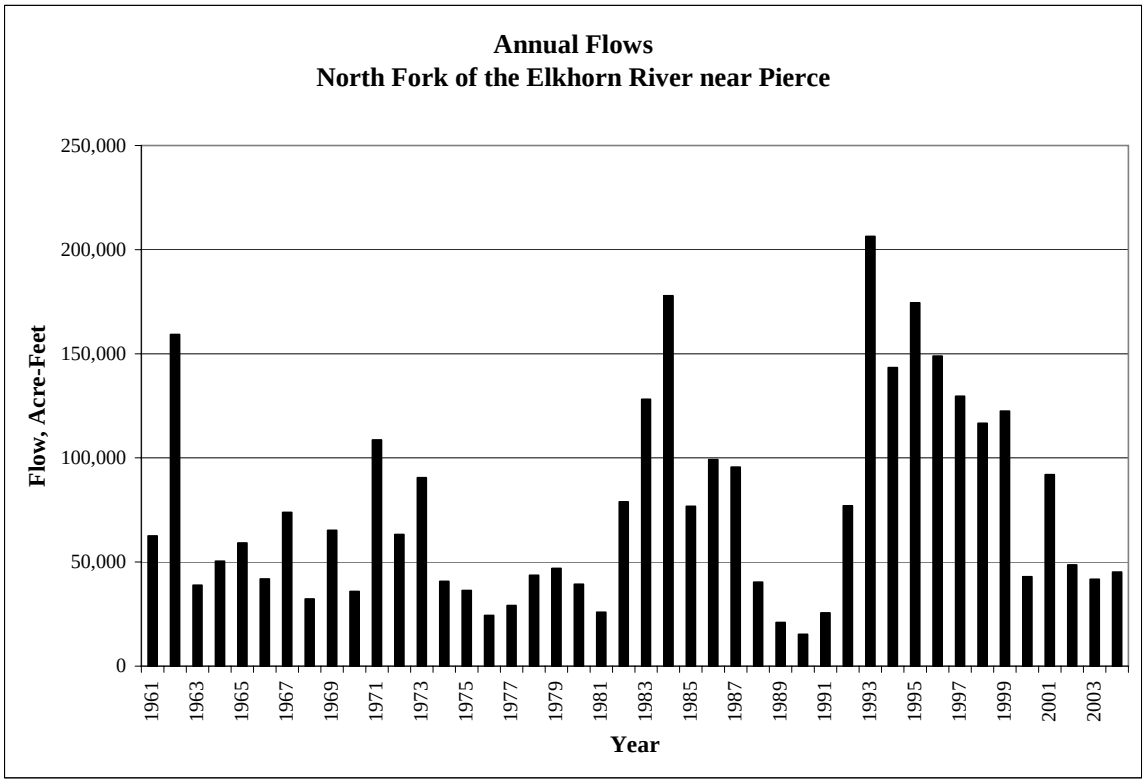


Figure E-40. Annual Flows, Union Creek at Madison.

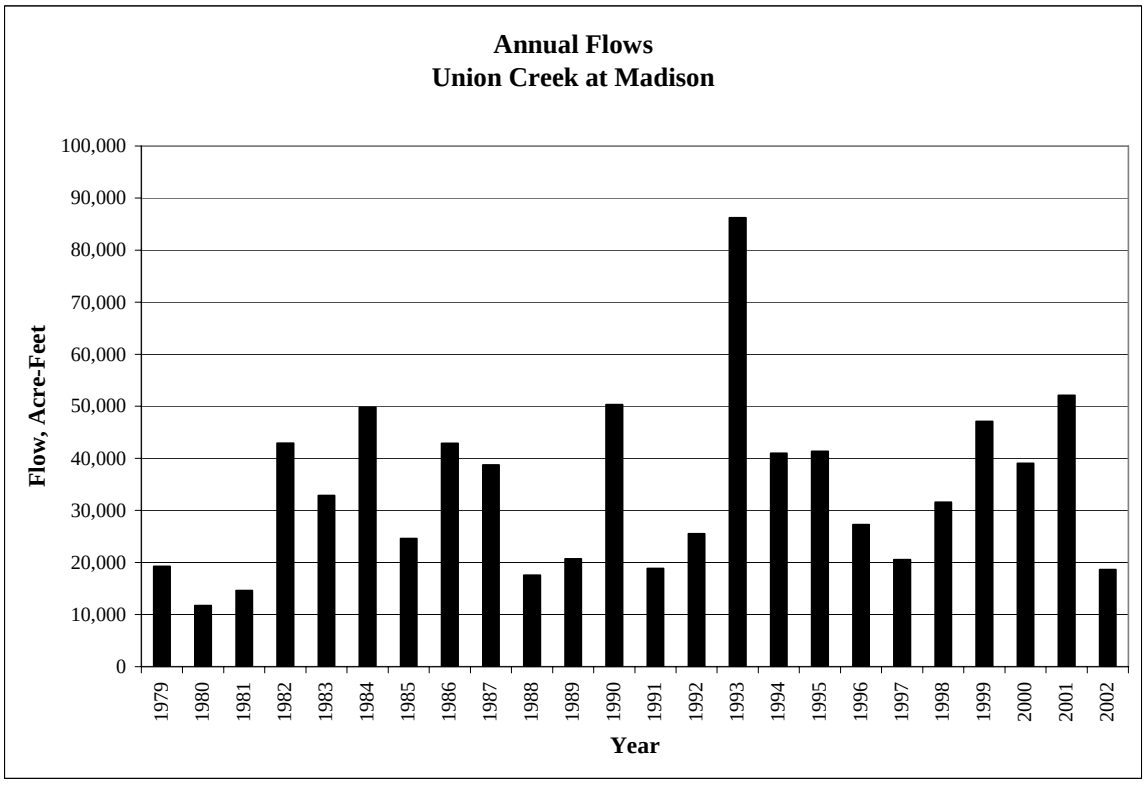


Figure E-41. Annual Flows, Pebble Creek at Scribner.

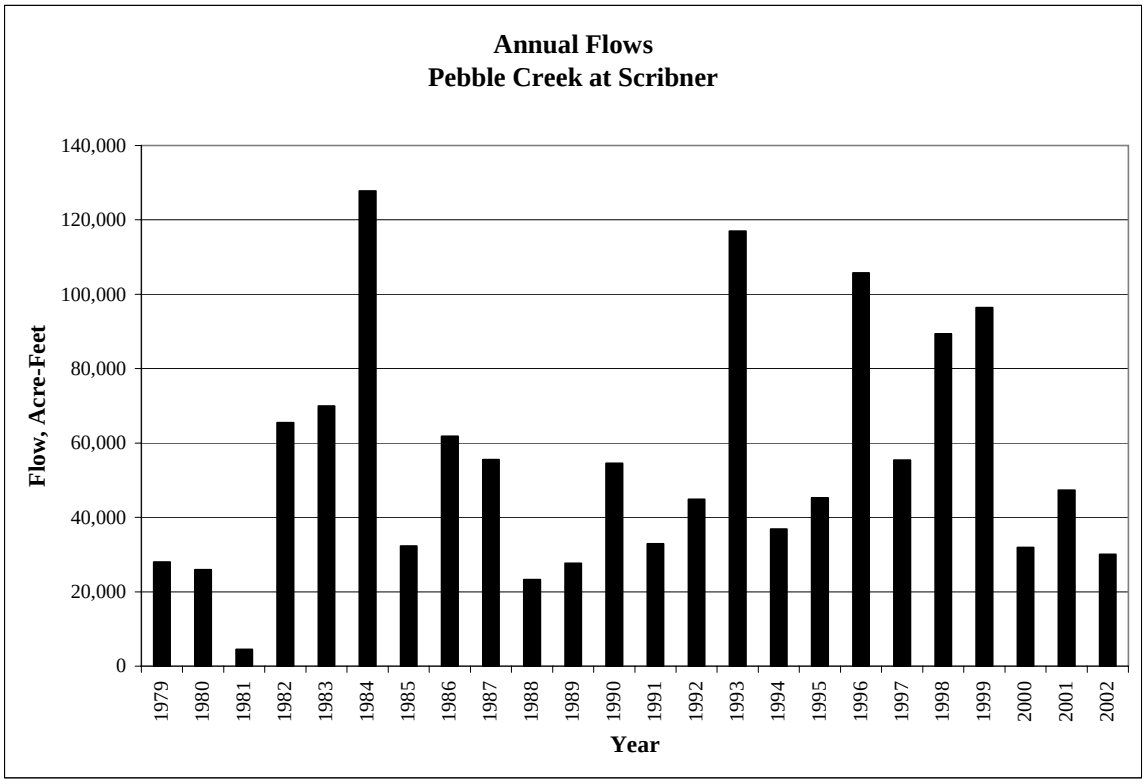


Figure E-42. Annual Flows, Maple Creek near Nickerson.

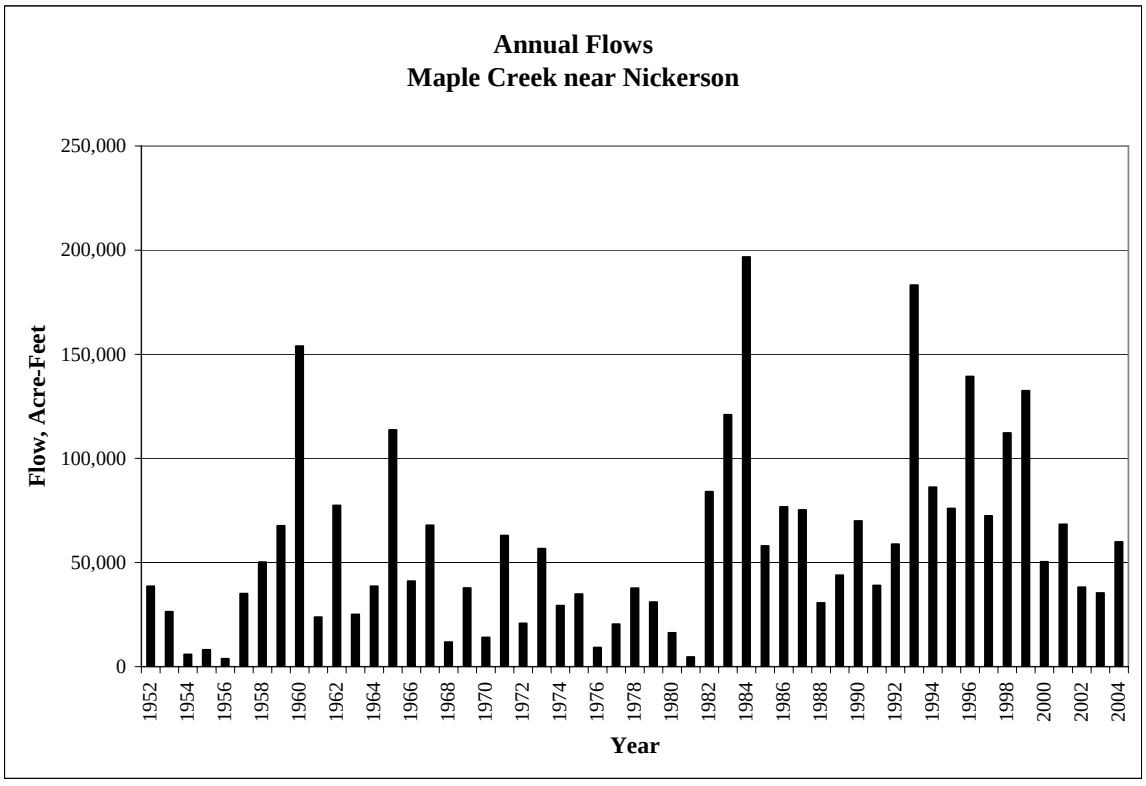


Figure E-43. Annual Flows, Logan Creek at Pender.

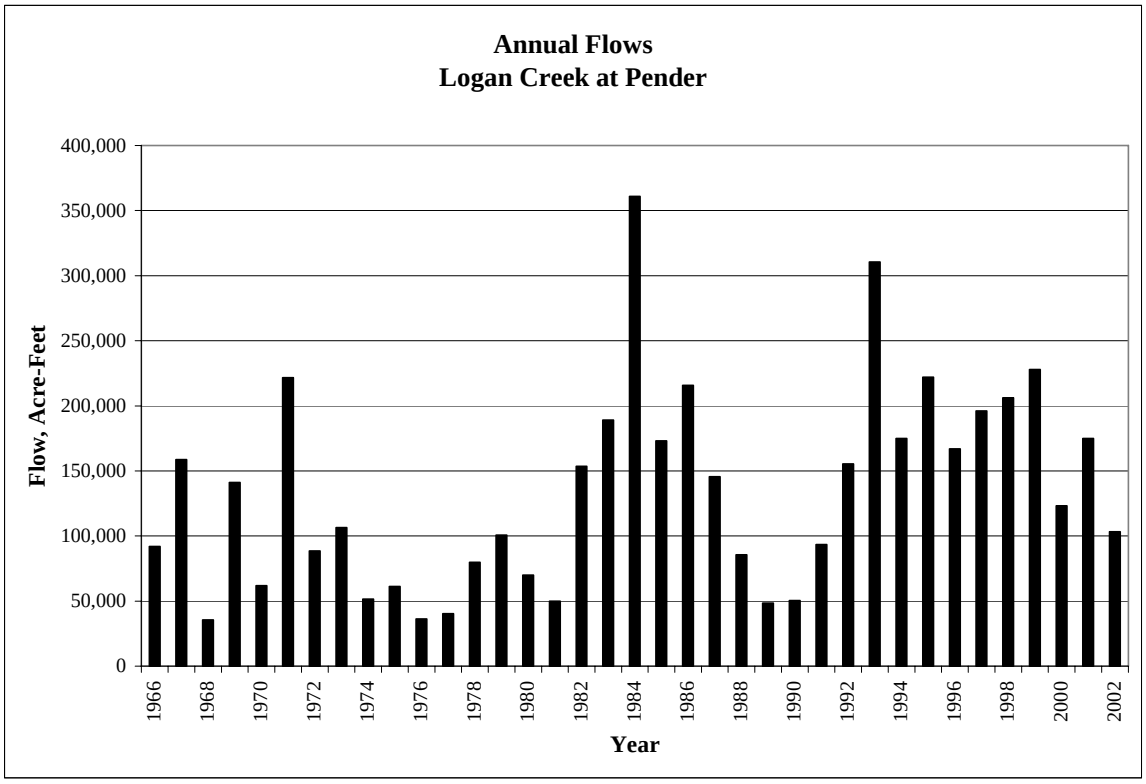


Figure E-44. Annual Flows, Logan Creek near Uehling.

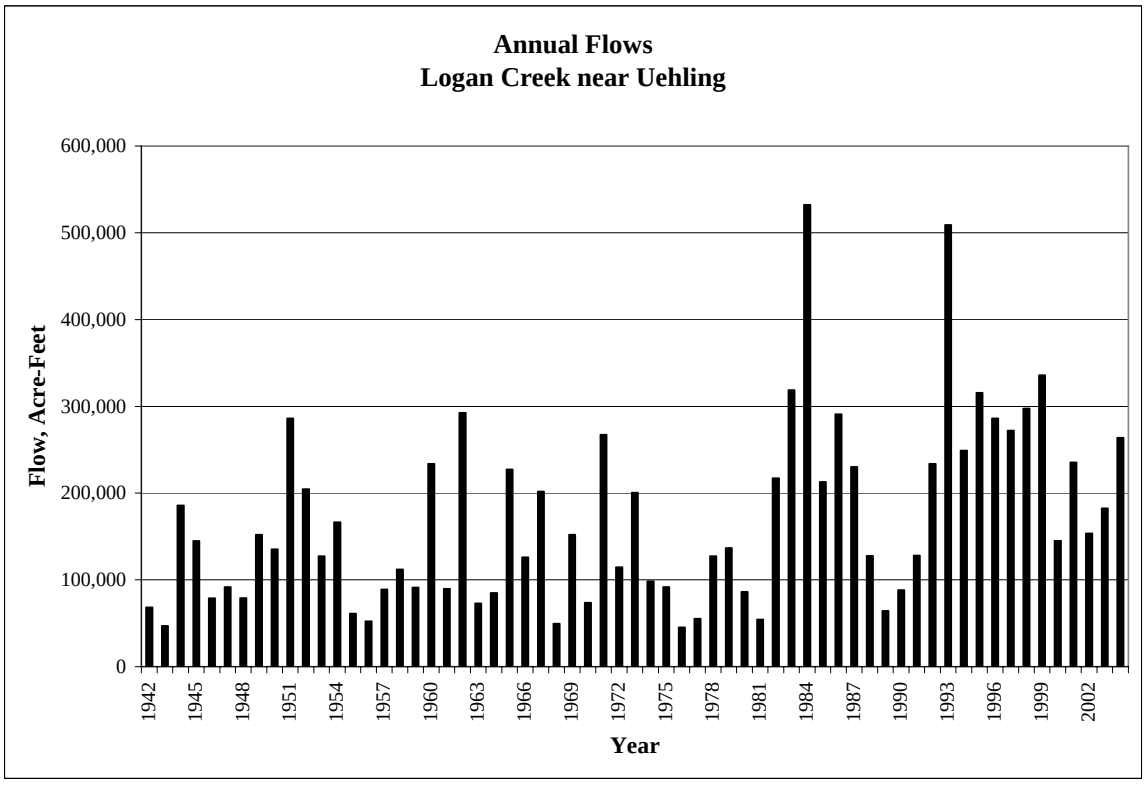


Figure E-45. Annual Flows, Elkhorn River near Atkinson.

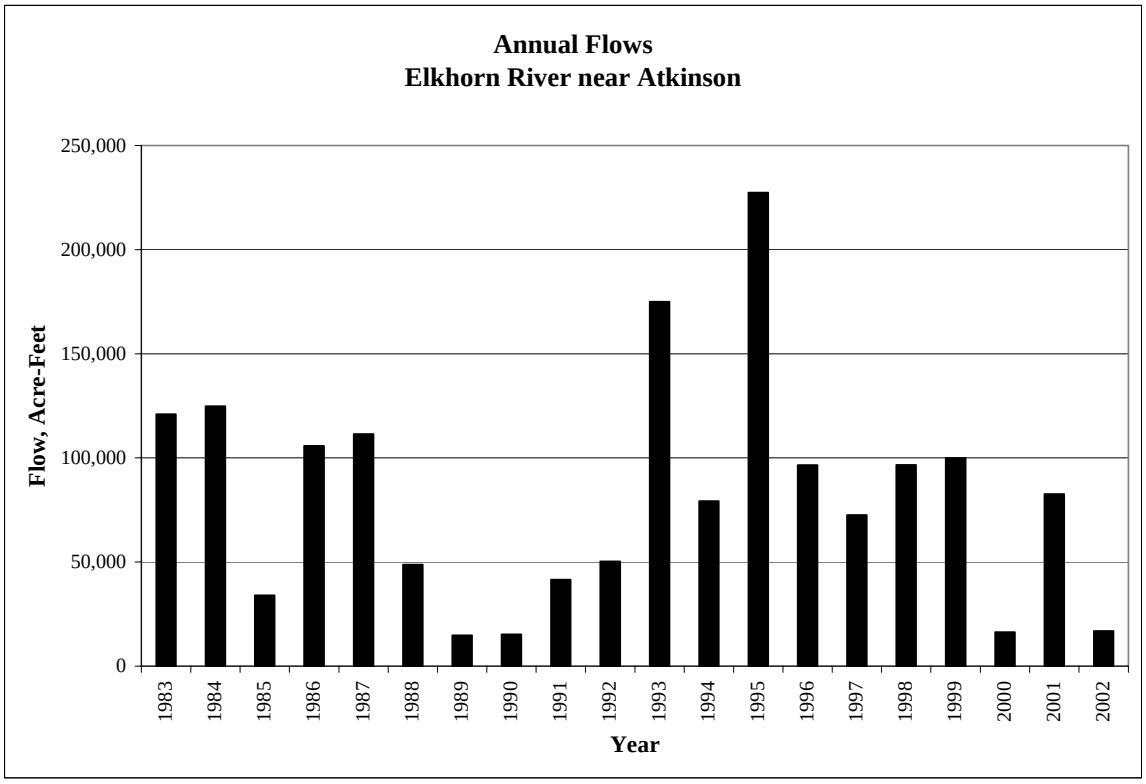


Figure E-46. Annual Flows, Elkhorn River at Ewing.

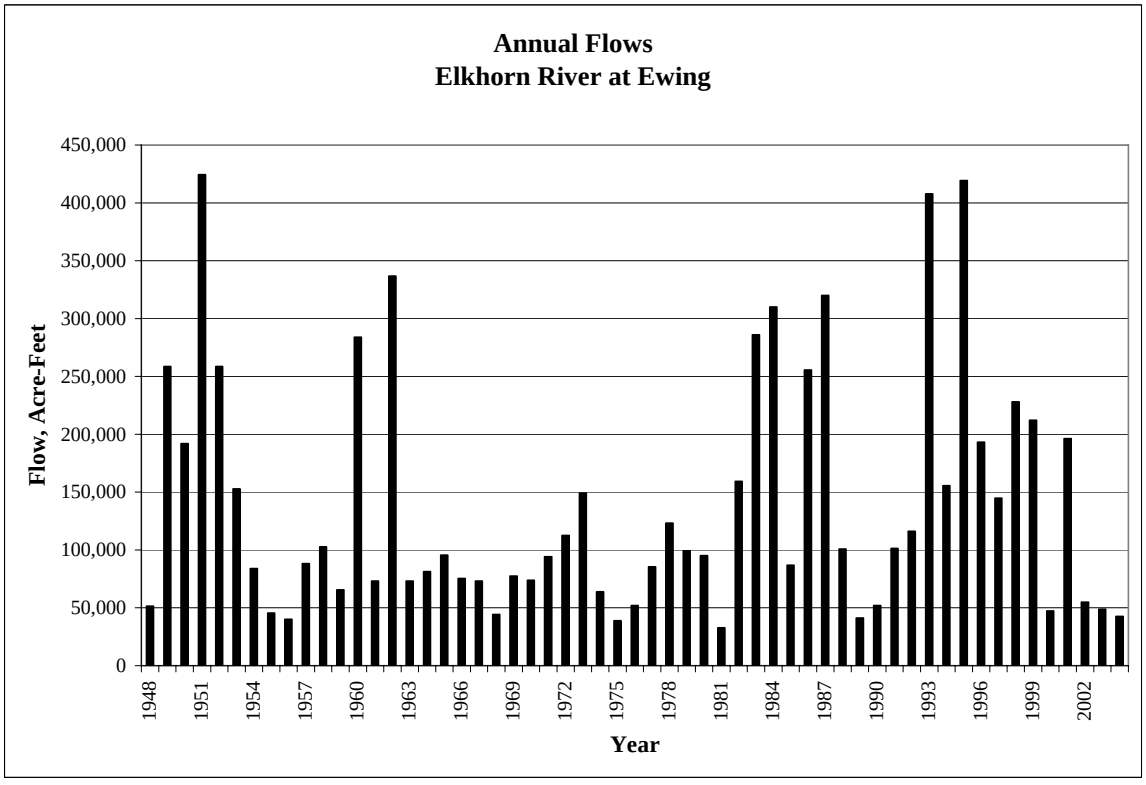


Figure E-47. Annual Flows, Elkhorn River at Neligh.

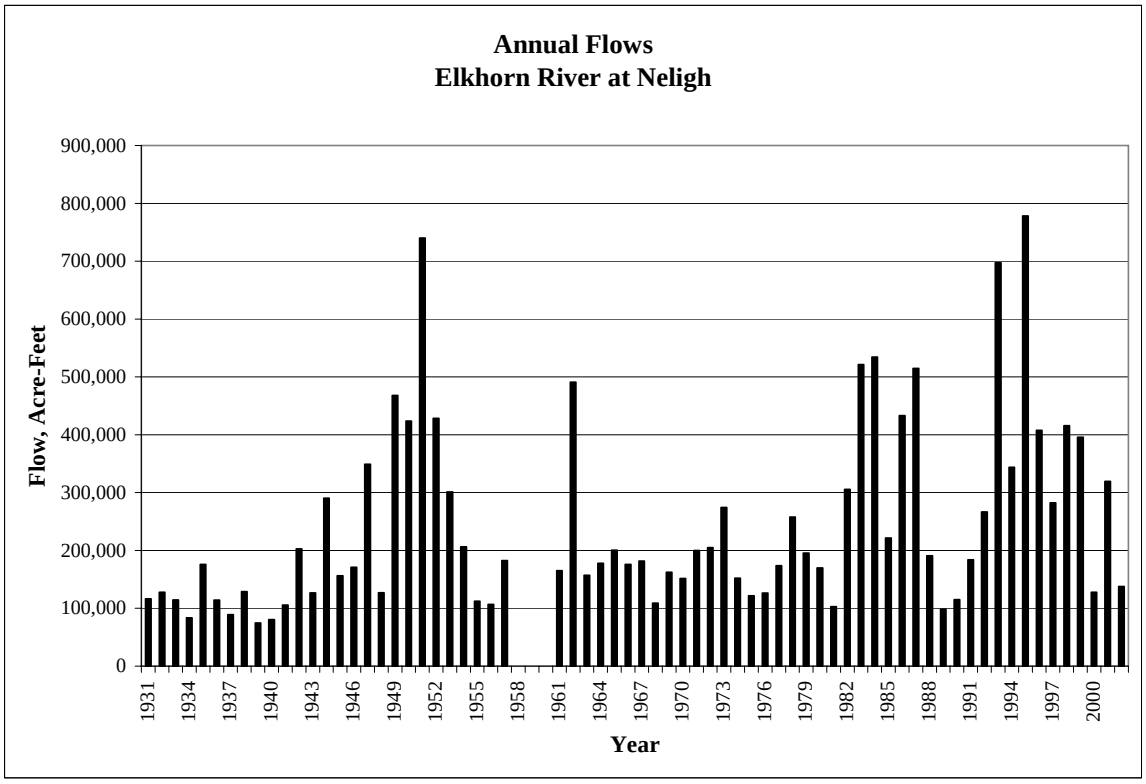


Figure E-48. Annual Flows, Elkhorn River at Norfolk.

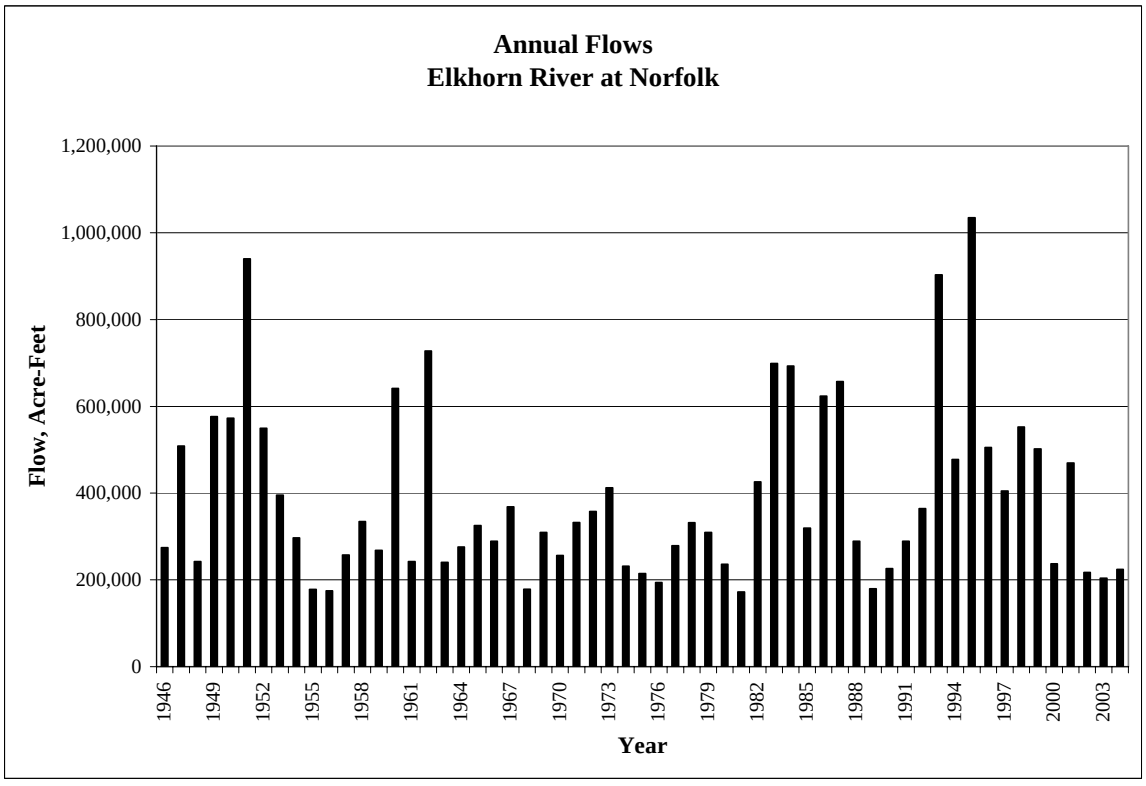


Figure E-49. Annual Flows, Elkhorn River at West Point.

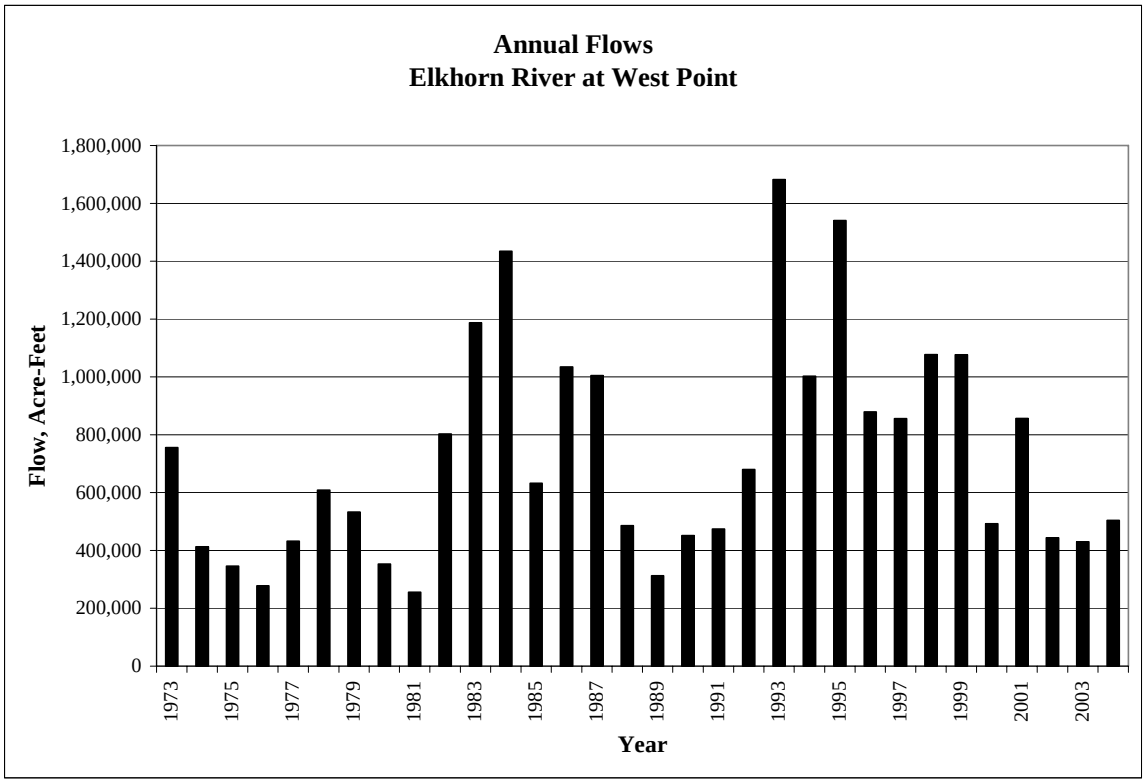
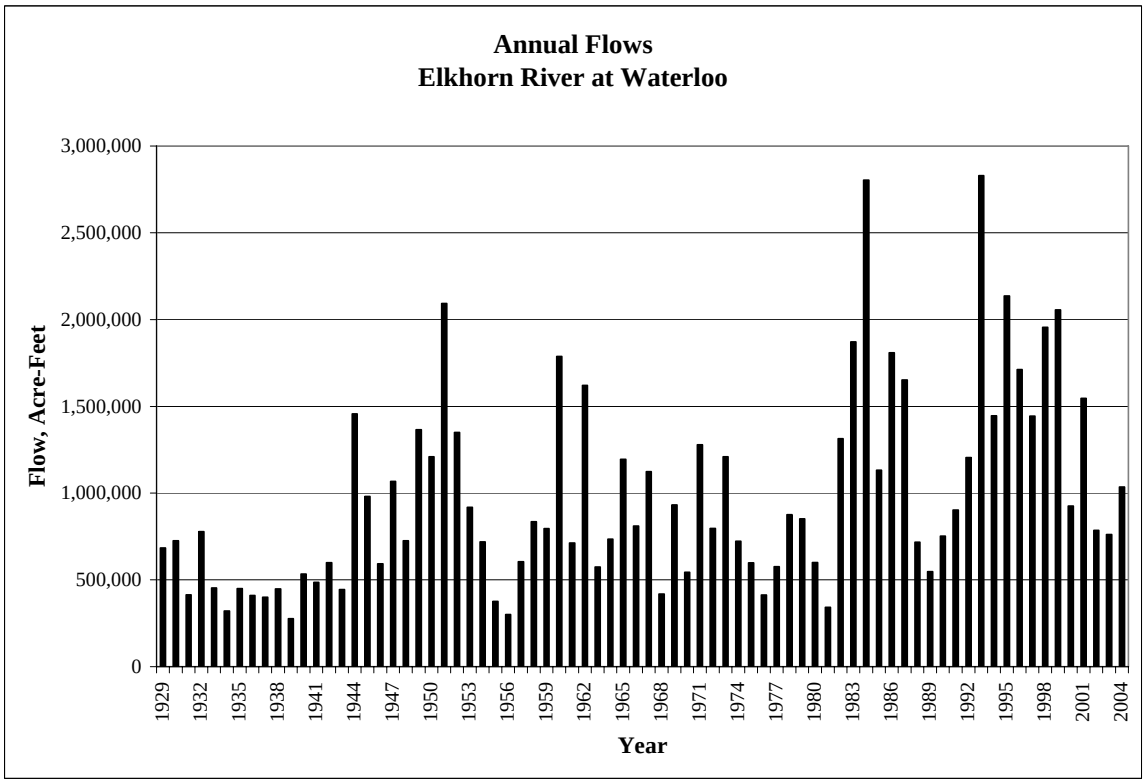


Figure E-50. Annual Flows, Elkhorn River at Waterloo.



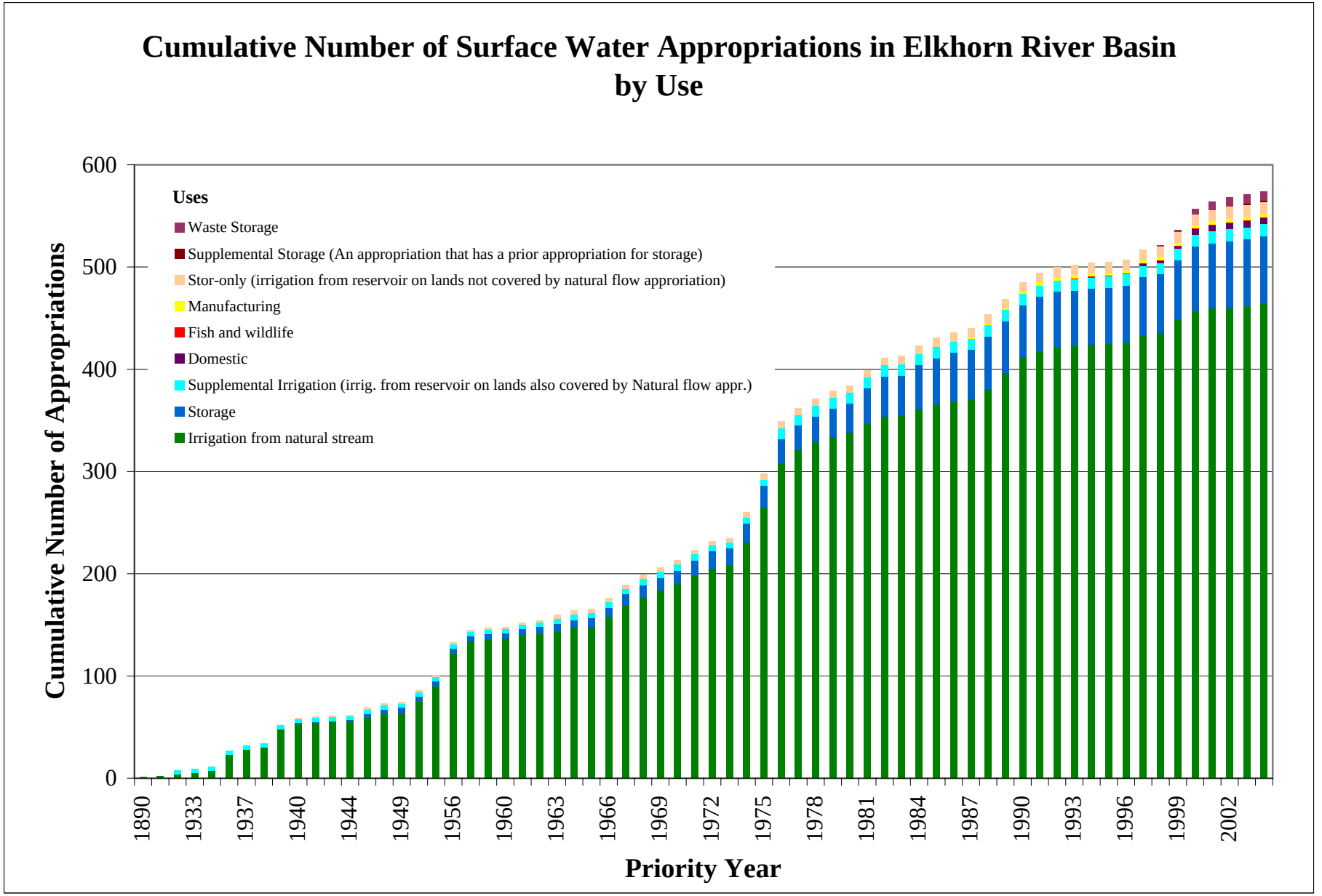


Figure E-51

11/23/2005 by Shuhai Zheng

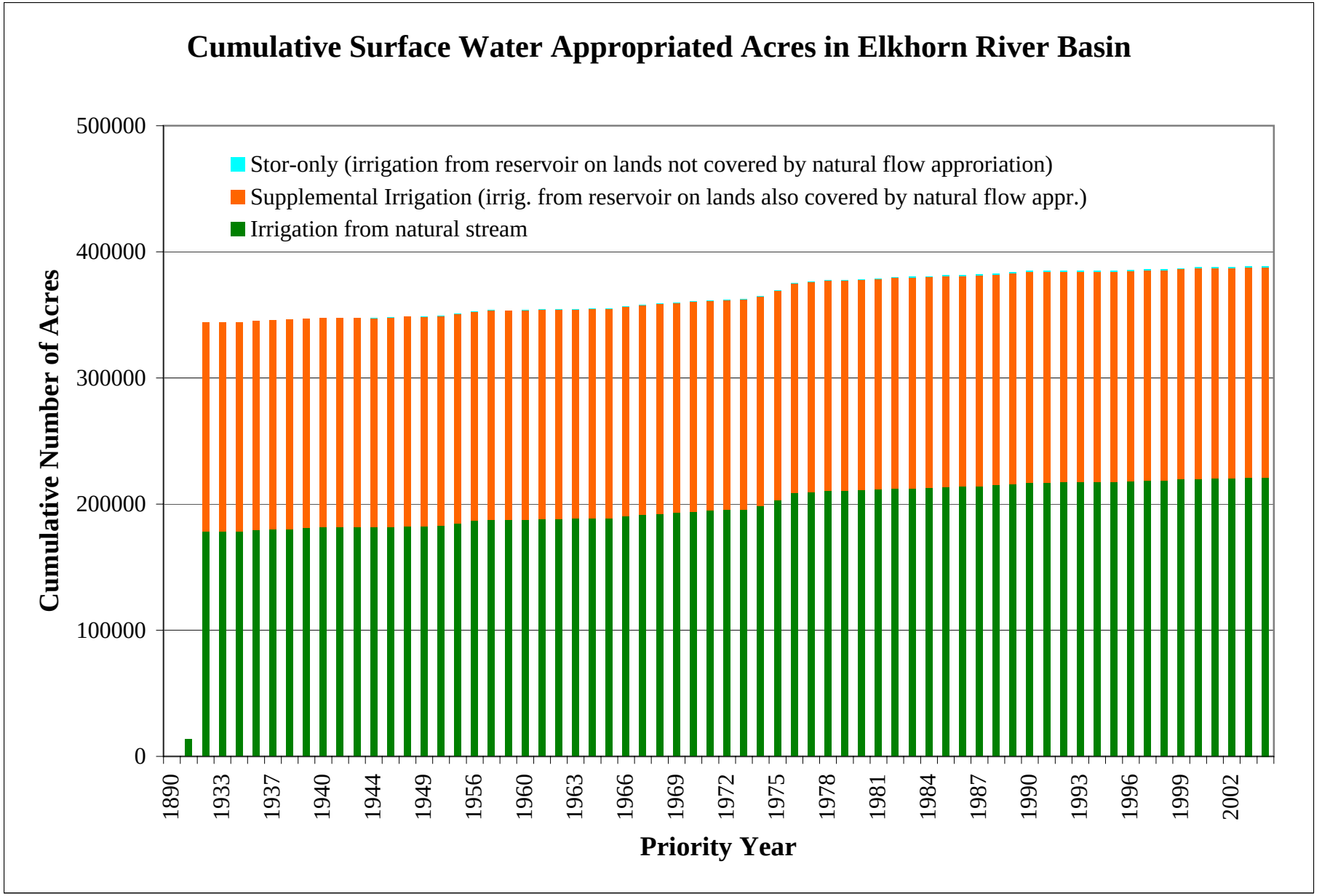


Figure E-52

11/23/2005 by Shuhai Zheng

Planning and Assistance Division

Corn Irrigation Requirement

ELKHORN RIVER BASIN

N
W E
S

LEWIS & CLARK NRD
CEDAR
DIXON
LOWER ELKHORN NRD
DAKOTA
THURSTON
PAPIO-MISSOURI RIVER NRD
ROCK
HOLT
UPPER ELKHORN NRD
ANTELOPE
PIERCE
WAYNE
WHEELER
MADISON
STANTON
CUMING
BURT
BOONE
WASHINGTON
DODGE
COLFAX
PLATTE
LOWER PLATTE NORTH NRD
DOUGLAS
SARPY

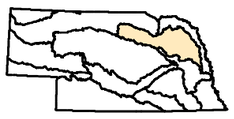
Explanation

- Elkhorn Basin
- Corn Irrigation Requirement

Cultural Features

- County Boundary
- State Boundary
- NRD Boundary

Location Map



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0 4 8 16 24 32 Miles

Figure E-53.

Base map produced by Josh Lear, February 4, 2005
Base map approved February 4, 2005
Transmissivity map produced by Kevin J. Schwartman, December 7, 2005

Bibliography of Hydrogeologic References for Elkhorn Basin

Citation

Bentall, R., 1971, Water supplies and the land--the Elkhorn River Basin of Nebraska / by Ray Bentall and others ; prepared cooperatively by Conservation and Survey Division, University of Nebraska, Department of Water Resources, State of Nebraska, Water Resources Division, U.S. Geological Survey, Lincoln : University of Nebraska, Conservation and Survey Division, 1971.

Citation

Bentall, R.& Hamer, T., 1980, Stream-Aquifer Relationships in Nebraska: UNL Conservation and Survey Division and Nebraska Department of Water Resources, 102 pages, 171 illustrations.

Citation

Boohar, J.A., and Provaznik, Mary Kay, 1996, Peak flows for the period of record for current and discontinued streamflow stations in Nebraska: U.S. Geological Survey Open-File Report 96-101, 518 p.

Citation

Brogden, R.E., 1972, A model of a Platte-Elkhorn Valley aquifer. Thesis (M.S.)--University of Nebraska--Lincoln, 1972.

Citation

Brogden, R.E., Shaffer, R.B. and Engberg, R.A., 1976, Water Resources of Pierce County, Nebraska: UNL Conservation and Survey Division, Nebraska Geological Survey Paper 41, 35 pages.

Citation

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